

MOTOR AGE

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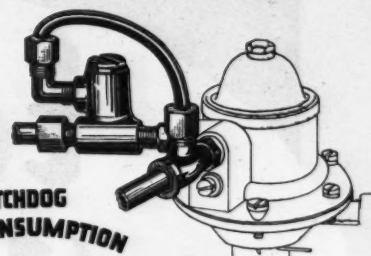
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MOTOR AGE, September, 1936



THE WATCHDOG
OF GAS CONSUMPTION

Guards Your
Customers
Against



FUEL PUMP
PRESSURE GOVERNOR

Another Hit
by **HYGRADE**

—loss of gas
through car-
buretor leaks

—feeding raw
gas into
cylinders

—crankcase
dilution

—throwing
carburetor
float out of
adjustment

YOUR customers will be grateful to you for introducing them to this new Hygrade unit, which instantly puts an end to the most common cause of GAS WASTE—fuel pump OVERPRESSURE.

It's a proven fact that nearly all Fuel Pumps are operating at overpressure—EATING UP GAS AT A FRIGHTFUL RATE by flooding the carburetor.

Any motorist who realizes the waste that is taking place in his car daily through fuel pump overpressure is a live prospect for the Hygrade Pressure Governor. Balances the Fuel Pump pressure with the Carburetor float level, preventing fuel loss and all the other evils resulting from overpressure.

Car owners enthusiastic wherever introduced. Shops cashing in big. You are entitled to your share of this profitable business.

Write us direct if your jobber can't supply you, being sure to send us his name.

HYGRADE PRODUCTS CO.
516 W. 34th St. New York, N. Y.



IMPERIAL Fittings & Tools



No. 48-F, Half Union



No. 41-F, Union Nut



No. 62-F, Union

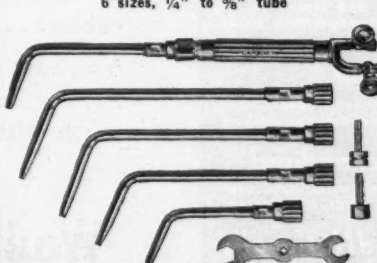
ALL fittings used in copper tubing replacement are included in this popular line—also flexible tubing in standard lengths and coils for replacement in any length. Imperial service tools are in wide demand for quick, efficient work; a few types are shown.



Imperial Tube Bender
6 sizes, 1/4" to 3/4" tube



Imperial Flaring Tool
3 sizes, 3/16" to 1" tube



Imperial Tube Cutter
Roller Type, 3/16" to 3/4" tube

Order from your jobber

**IMPERIAL BRASS
MFG. CO.**

1217 West Harrison St.
CHICAGO

Type 8X, Imperial Welding Torch
Swaged Tips

tops them all

There are many reasons why Wagner CoMaX is the world's outstanding brake lining for quick, safe, smooth stops.

1. Non-Compressible

Does not compress under pressure. Brakes lined with Wagner CoMaX run for long intervals without adjustment.

2. Homogeneous

Uniform texture throughout. As the lining wears, the same type of braking surface is always exposed to the drum.

3. Easy on Drums

Contains no abrasive material.

4. Ideal for High Speeds

No fade-out under high friction temperatures. It is the brake lining for your high-speed buses.

5. Quiet

Grips softly, quietly — produces no objectionable noise.

6. Smooth

Assures smooth, controllable deceleration.

7. Age-Proof

It remains "new" always.

8. Priced Right

Sells at competitive prices, notwithstanding its superior qualities.

9. Complete Coverage

Available in sets, rolls, and blocks, for all makes and models of passenger cars, trucks, tractors, trailers, etc.

10. Wire-Backed

The wire backing permits extra deep seating of rivets, lengthening time between relining.

11. Well Merchandised

Strikingly colorful counter-cards, signs, overseas caps, boxes, leaflets, cards, bulletins, etc.

12. Warehoused Nationally

Promptly shipped from 25 strategically located factory branches.



CoMaX BRAKE LINING MERCHANDISER

*puts you in a position
to service most popular cars*

You'll like this new "silent salesman" — and all that goes with it.

Cabinet is of steel . . . stands 28½" high, is 16" x 16" at the base, and has capacity to hold 24 sets and 4 rolls of CoMaX.

Deal No. FL-30¹ consists of 3 rolls and 7 sets of the world's outstanding brake lining, complete with attractive steel cabinet . . . \$40.91 net to the trade.

You have a choice of larger "Deals" at \$54.64 and \$81.30 . . . For detailed information — ask your jobber or get in touch with nearest Wagner branch.

AUTOMOTIVE PARTS DIVISION
Wagner Electric Corporation

6400 Plymouth Avenue Saint Louis, U. S. A.



They'll be coming 'round the mountains, lakes and valleys, from the four corners of the world as they return from their vacations. Tires will be worn, wheels misaligned, compression gone, spark plugs fouled or burnt, body finish dull and all in all your customers will be ready for about everything you can sell them. And while you are selling them, it's not too early to think about preparing the car for winter service.

S H O P T A L K

THE first of the 1937 cars are here. In this issue complete descriptions of the new Packard and Studebaker lines are given. From a performance and appearance point these cars represent another step ahead and through the service man's eyes they do not present any new difficulties. Lubrication of the hypoid gears will of course have to be watched since special lubricants are required and care must be exercised to prevent mixing different types of lubricants otherwise there will be trouble. New spark plug wrenches are in order to take care of the new 10 millimeter plugs in the Packard Six.

LETTERS from Charlie Berg of Kansas City, Don Herr of Indianapolis, and E. T. Sadler of Chicago, inform me that the annual meeting of the International Garage and Maintenance Association will be held at the Morrison Hotel, Chicago, September 21, 22 and 23. They urge that local associations send representatives to the meeting and "to have a voice in the discussions and in the formation of a policy which operators all over the country can get behind." If you want any addi-

tional dope on the meeting write to E. T. Sadler, 160 E. Illinois St., Chicago.

WELL, the Patman-Robinson bill has become law and intrepid souls over the land are doing their darndest to interpret it. And they are fearless souls for even the Federal Trade Commission has refused to give an interpretation. So it will only be after someone is haled into court that a real decision will be made. Meanwhile some companies are standing pat, while others are trying to live up to what they think the law means.

NEWs from Detroit indicates that one important producer is recommending that its dealers pay their mechanics on an hourly or weekly basis rather than on the flat rate basis. The reason being to insure that the mechanic receives an adequate wage. A better method would be to pay the "adequate" wage plus a bonus based on the amount of work done. In that way the mechanic is as-

sured of having enough to live on and also has an added incentive to get the work done as quickly as possible, so as to increase his bonus. At the same time the shop operator does not have so much idle time to worry about and his overhead is reduced.

LETTERS continue to pour in to the Reader's Clearing House in an ever increasing stream. Probably one reason for the increase, is the speed with which these requests for help are now answered. With "Hank" and myself on the job, answers go out the same day they are received, which is quite an improvement over the days when I had to handle the whole works by myself.

THAT Chandler-Groves carburetor on the new Packard Six looks interesting. There will be a story on it in the course of the next few months.

Bill Toboak

Studebaker

Hypoid Rear Axles missions Among New Line of Dictator Sixes

TO Studebaker goes the honor of being the first to announce its cars for the 1937 season, continuing the simplified line of Dictator Sixes and President Eights. While there is nothing radical in body construction or chassis features, the Studebaker line does reveal many improvements both in styling and mechanism that contribute to eye-appeal, safety, and performance. As in 1936, base prices start with \$665 f.o.b. factory for the Dictator and \$965 f.o.b. factory for the President.

Eye-appeal is given a new meaning by virtue of special treatment of the radiator and new one-piece hinged hood. Horizontal grids on the radiator front are drawn rearward along the top section of the hood to carry out the louver treatment. Deep, one-piece fenders are faired to reduce wind resistance and blend with body and radiator contours. Headlamps have been raised to assure a longer beam for night driving. Running boards are of colored rubber to match individual body color. Chromium-plated disk wheels now are standard equipment throughout the entire line.

All body models have an improved ventilating system comprising fixed windshield, split front windows with the forward ventilating pane pivoted in the garnish molding, and with rear quarter windows of the

Note the new appearance of the Studebaker line and how the radiator grille lines are carried back along the sides of the hood.



r for 1937

and Overdrive Trans- Features Offered in and President Eights

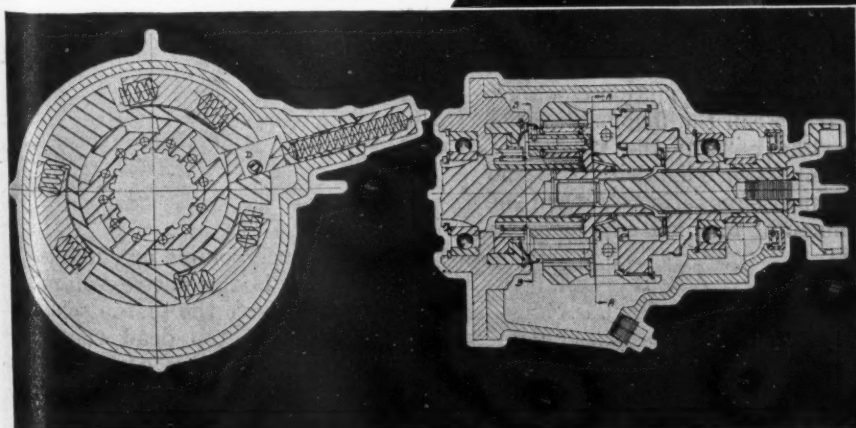
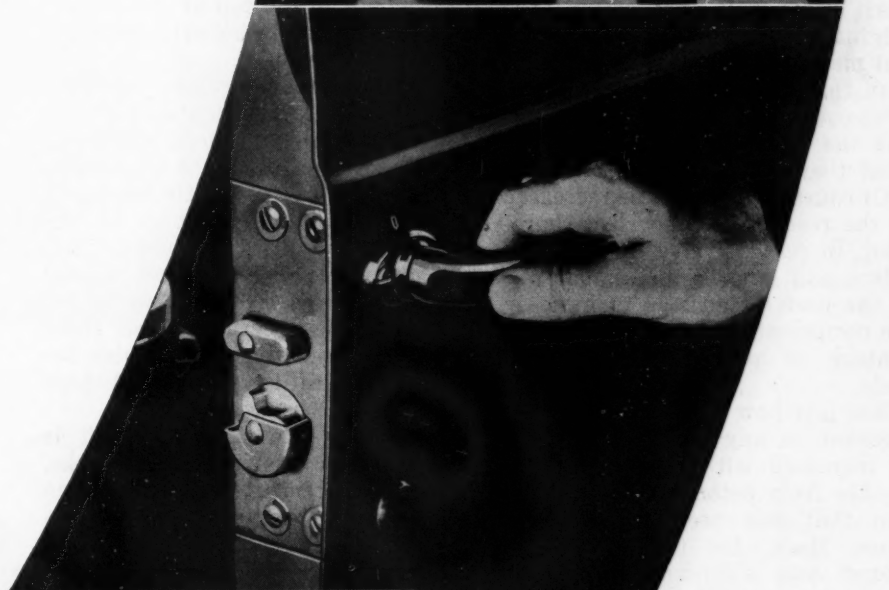
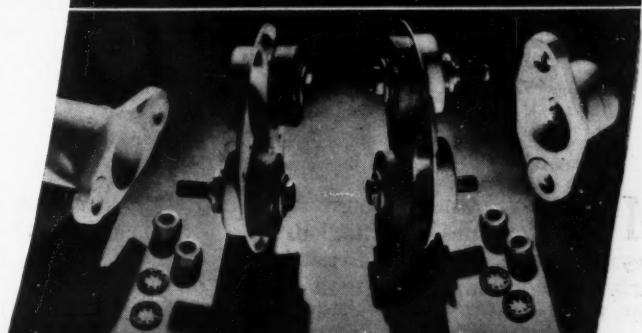
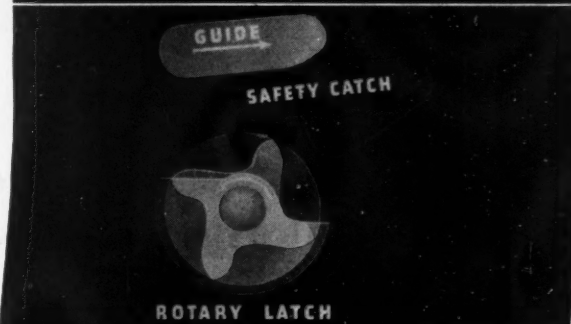
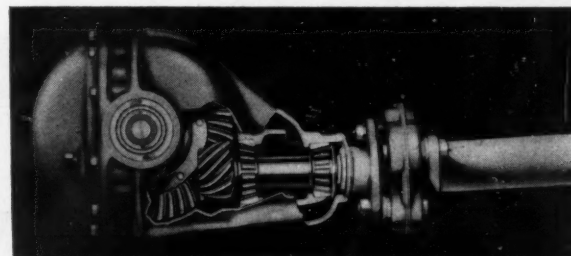
pivoted type opening out to the rear. The cowl ventilator has a firm lock.

Save for detail changes the engines remain the same as last year. The Dictator is powered with a 6-cylinder L-head engine, having a 3¼-in. bore and 4½-in. stroke and 217.8-cu. in. displacement, rated 90 hp. at 3400 r.p.m., with cast-iron head and standard compression ratio of 6.0 to 1. Pistons are of Lynite, cam-ground and with T-slot. Stromberg down-draft carburetor and automatic choke are standard equipment. Spark plugs are 18 mm. Connecting rod and main bearings are of babbitt, spun in connecting rod and steel backed in main bearings. Camshaft gears are of non-metallic type on all models.

The President engine is 8-cylinder, L-head, 3 1/16-in. bore x 4¼-in. stroke, 250.4-cu. in. displacement, rated 115 hp. at 3600 r.p.m., with aluminum head and standard compression ratio of 6.5 to 1. Lynite pistons are standard.

All Studebaker engines are fitted with the "Fram" oil cleaner. Motorists will be advised by the factory that crankcase oil need no longer be changed periodically except for summer and winter seasonal changes. When the oil is too dirty, by the dip-stick test, the owner is instructed to replace the "Fram" cartridges.

(Continued on page 91)



At the top is shown the hypoid rear axle, below details of the rotary door latch. Next the rubber insulated universal joints. Then external view of the new door latch. Bottom, the overdrive transmission unit.

More Power To You

Increasing Compression on an Old Car Is Like Grafting Monkey Glands on Father Time

By Bill Toboldt

MORE car owners would have their engines overhauled if they could be assured of getting performance comparable to a current series car. Simply replacing worn parts will only restore the original power to an old engine. But many car owners demand more than that. They want performance comparable to a current series car and the shop that can give them what they want gets the business.

Of course, power can be increased as the result of improved carburetion, increased valve lift, larger valves and other changes, but one of the best methods is to increase the compression ratio and take advantage of present-day premium fuels.

But just how much can the compression on any particular engine be increased without getting into trouble from detonation is a question that has been asked many times. Here, for the first time, **MOTOR AGE** is providing a table, which shows just how much should be removed from a cylinder head or block to get maximum performance with premium fuels. The new ignition timing required for the new compression ratio is also given.

All that is necessary is to consult the table and then machine the head or block, so as to remove the required amount of metal. For those few cars that are not listed, the procedure given later in this article may be followed.

First of all there are three general methods employed to increase the compression ratio of an engine:

1—by machining the correct amount of stock from the cylinder head or cylinder block; 2—by installation of new pistons having a greater distance from the center of the wrist pin to the top of the piston; 3—high compression cylinder heads may be installed.

For L-head engines the first method—that is machining of the cylinder head is usually employed. For overhead valve jobs higher pistons are most frequently employed, or the cylinder block may be machined. The third method is naturally used whenever such special cylinder heads are available. As far as could be ascertained, all those cars have been listed for which the car factories have provided high compression heads.

To make the calculations, it is necessary to know the bore, stroke, total displacement and compression ratio of the engine. Those values are given for all engines in the April issue of **MOTOR AGE** and also in the Chilton Flat Rate Manual.

Having this information it is then possible to calculate the size of the desired combustion chamber. Now if we call the displacement of one cylinder "A"; the volume of the combustion chamber "B," and the compression ratio "C," then the fundamental formula can be written as

$$C = \frac{A + B}{B}$$

$$\text{Also } B = \frac{A}{C - 1}$$



Here for the first time anywhere, **Motor Age** presents a simple, direct guide showing you exactly how much metal to remove from a cylinder head or block to get maximum performance with premium fuels. Changing compression ratios is not difficult. All that is necessary is to consult the table on page 22, then machine the head or block to remove the required amount of metal.

**This Information Is Valuable.
Keep It Handy!**

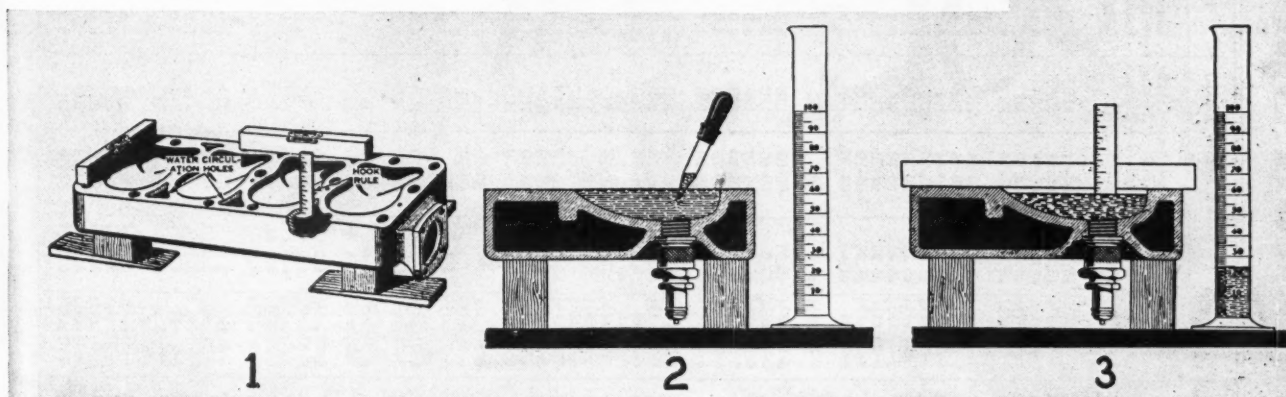
The clearance volume or combustion chamber is the entire volume of the space above the piston when the piston is at top dead center. Naturally the thickness of the cylinder head gasket will increase the volume of the combustion chamber



Fig. 1—Remove carbon and level the head. Check thickness of metal to be machined.

Fig. 2—Remove enough oil to reduce contents to that required for new ratio.

Fig. 3—Measure from surface of head down to oil to determine amount of metal to be removed.



slightly and the amount the valve head takes up will decrease the volume of the combustion chamber. While details for calculating the exact volume of the combustion chamber together with the gasket and valve volumes will be given

later, the valve-gasket volume is usually taken as 10 cubic centimeters for small bore engines and for engines larger than 3-in. bore the valve-gasket volume is taken as 12 cc. In older engines it may be as high as 15 cc.

As an example, suppose it is desired to increase the compression ratio of a 1935 Olds 8 to 6.9 to 1. The standard compression ratio of

(See Table of Specifications on p. 22)

(Continued on page 88)

Compression Specifications For Increased Power

MAKE AND MODEL			STANDARD COMP. RATIO			HIGH COMPRESSION RATIO			HIGHER COMPRESSION RATIO		
Displacement	Bore and Stroke	Reduction in Clearance Volume	Com-pression Ratio	Octane No. of Fuel Required	Spark Timing Degrees	Com-pression Ratio	Octane No. of Fuel Required	Spark Timing Degrees	Com-pression Ratio	Octane No. of Fuel Required	Spark Timing Degrees
AUBURN											
8-100, 1A.....	1932-33	268.6	6.25	60-64	13B	6.25	60-64	13B	6.25	60-64	13B
6-52X, Y.....	1934	209.9	6.40	65-68	3B	6.40	65-68	3B	6.40	65-68	3B
8-50 (GF).....	1934	279.9	6.40	65-68	3B	6.40	65-68	3B	6.40	65-68	3B
8-50 (GC).....	1934-35	279.9	6.7	68-70	3B	6.7	68-70	3B	6.7	68-70	3B
6-53.....	1935	209.9	6.7	68-70	3B	6.7	68-70	3B	6.7	68-70	3B
BUICK											
8-32-50.....	1932	230.4	5.8	60-64	7B	5.8	60-64	7B	5.8	60-64	7B
8-32-60.....	1932	272.6	5.8	60-64	11B	5.8	60-64	11B	5.8	60-64	11B
8-32-33-50-90.....	1932-33	344.8	5.8	60-64	10B	5.8	60-64	10B	5.8	60-64	10B
8-33-50.....	1933	272.6	5.8	68-70	7B	5.8	68-70	7B	5.8	68-70	7B
8-33-60.....	1933	272.6	5.8	68-70	11B	5.8	68-70	11B	5.8	68-70	11B
8-34-35-40.....	1934-35	233.0	5.8	68-70	2B	5.8	68-70	2B	5.8	68-70	2B
8-34-35-50.....	1934-35	233.0	5.8	68-70	7B	5.8	68-70	7B	5.8	68-70	7B
8-34-35-60.....	1934-35	278.1	5.8	68-70	11B	5.8	68-70	11B	5.8	68-70	11B
8-34-35-90.....	1934-35	344.8	5.8	68-70	10B	5.8	68-70	10B	5.8	68-70	10B
CADILLAC											
355, B, C.....	1931-32-33	353.0	5.7	70	9B	5.7	70	9B	5.7	70	9B
CHEVROLET											
1929-31.....	1932	193.9	5.8	60-65	12B	5.8	60-65	12B	5.8	60-65	12B
Standard.....	1933	183.9	5.8	60-65	12B	5.8	60-65	12B	5.8	60-65	12B
Master.....	1933	183.9	5.8	68-70	10B	5.8	68-70	10B	5.8	68-70	10B
Standard.....	1934	183.9	5.8	68-70	10B	5.8	68-70	10B	5.8	68-70	10B
Master.....	1934	206.8	5.8	68-70	10B	5.8	68-70	10B	5.8	68-70	10B
CHRYSLER											
CL, CO.....	1932-33	223.9	6.2	68-70	10B	6.2	68-70	10B	6.2	68-70	10B
CP.....	1932-33	223.9	6.2	68-70	10B	6.2	68-70	10B	6.2	68-70	10B
CH, CL.....	1933	384.8	6.2	68-70	11B	6.2	68-70	11B	6.2	68-70	11B
CL, Custom.....	1933	384.8	6.2	68-70	11B	6.2	68-70	11B	6.2	68-70	11B
CA, CB.....	1934	281.6	6.2	68-70	7C	6.2	68-70	7C	6.2	68-70	7C
CU Royal.....	1934	281.6	6.2	68-70	7C	6.2	68-70	7C	6.2	68-70	7C
CV Imperial.....	1934	281.6	6.2	68-70	7C	6.2	68-70	7C	6.2	68-70	7C
CZ.....	1935	273.5	6.2	68-70	7C	6.2	68-70	7C	6.2	68-70	7C
CL, CL.....	1935	323.5	6.2	68-70	7C	6.2	68-70	7C	6.2	68-70	7C
DE SOTO											
SC.....	1932	211.5	6.5	68-70	9B	6.5	68-70	9B	6.5	68-70	9B
SD.....	1932	217.8	6.5	68-70	10B	6.5	68-70	10B	6.5	68-70	10B
SE.....	1933	241.5	6.5	68-70	4A	6.5	68-70	4A	6.5	68-70	4A
DODGE											
DK.....	1932	217.7	6.5	68-70	10B	6.5	68-70	10B	6.5	68-70	10B
DK.....	1932	222.2	6.5	68-70	10B	6.5	68-70	10B	6.5	68-70	10B
ESSEX											
SE.....	1932-33	193.1	5.5	65-70	TC	5.5	65-70	TC	5.5	65-70	TC
SE.....	1933	244.0	5.8	65-70	TC	5.8	65-70	TC	5.8	65-70	TC
FORD											
A.....	1932-33	200.5	4.22	60-65	27B	4.22	60-65	27B	4.22	60-65	27B
B.....	1932-33	200.5	4.6	60-65	27B	4.6	60-65	27B	4.6	60-65	27B
V-8.....	1932-33	221.0	5.5	60-65	4B	5.5	60-65	4B	5.5	60-65	4B
40-V-8.....	1933-34	221.0	6.3	68-70	4B	6.3	68-70	4B	6.3	68-70	4B
48-V-8.....	1935	221.0	6.3	68-70	4B	6.3	68-70	4B	6.3	68-70	4B
HUDSON											
Eight.....	1932-33	254.4	5.8	65-70	TC	5.8	65-70	TC	5.8	65-70	TC
Super 6.....	1933	193.1	6.2	65-70	TC	6.2	65-70	TC	6.2	65-70	TC
Eight.....	1934	254.5	5.75	68-70	TC	5.75	68-70	TC	5.75	68-70	TC
Eight.....	1935	254.5	6.0	68-70	TC	6.0	68-70	TC	6.0	68-70	TC
Six.....	1935	212.1	6.25	68-70	TC	6.25	68-70	TC	6.25	68-70	TC
HUPMOBILE											
216.....	1932-33	228.1	5.0	65-70	10B	5.0	65-70	10B	5.0	65-70	10B
222.....	1932-33	250.7	5.0	65-70	13B	5.0	65-70	13B	5.0	65-70	13B
226.....	1932-33	279.9	5.47	68-70	9B	5.47	68-70	9B	5.47	68-70	9B
321.....	1933	228.1	5.75	68-70	10B	5.75	68-70	10B	5.75	68-70	10B
417, 517.....	1934	224.0	5.32	68-70	7B	5.32	68-70	7B	5.32	68-70	7B

NOTES:
A—After top center
B—Before top center
C—Use Model CW, 1934 head
D—Use Model CL, 1933 head
E—Use Model DR, 1934 head
F—Use Model DO, 1933 head
G—Use Model DO, 1933 head
H—Use Model DO, 1933 head
I—Use Model DO, 1933 head
J—Use Model DO, 1933 head
K—Use Model DO, 1933 head
L—Use Model DO, 1933 head
M—Use Model DO, 1933 head
N—Use Model DO, 1933 head
O—Use Model DO, 1933 head
P—Use Model DO, 1933 head
Q—Use Model DO, 1933 head
R—Use Model DO, 1933 head
S—Use Model DO, 1933 head
T—Use Model DO, 1933 head
U—Use Model DO, 1933 head
V—Use Model DO, 1933 head
W—Use Model DO, 1933 head
X—Use Model DO, 1933 head
Y—Use Model DO, 1933 head
Z—Use Model DO, 1933 head

OF—Optional factory heads
TC—Top center

OF—Optional factory heads
TC—Top center

F—Use Model DR, 1934 head
G—Use Model DO, 1933 head

CI—Cast Iron
D—Use Model CL, 1933 head

C—Use Model CW, 1934 head
c.c.—Cubic centimeters

Al—Aluminum
B—Before top center

NOTES:
A—After top center



The READERS' CLEARING HOUSE

THIS department is written by the readers of Motor Age themselves! It presents their questions, their problems together with the practical analysis of the difficulties and replies from Bill Toboldt (left), editor of Motor Age and "Hank" Hankinson (right), technical editor. Read the Clearing House—then write us!

How to Overcome Oil Pump Trouble!

LOSES OIL PRESSURE

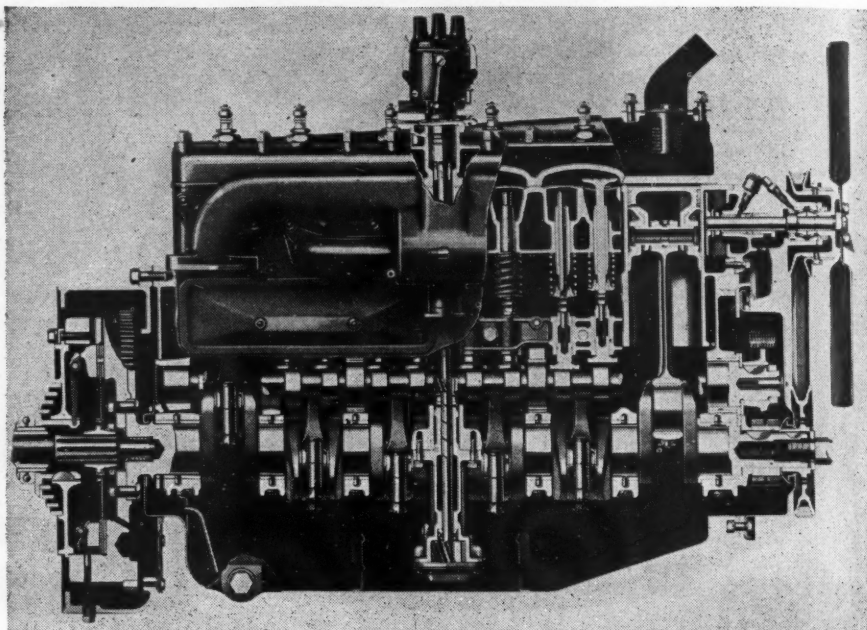
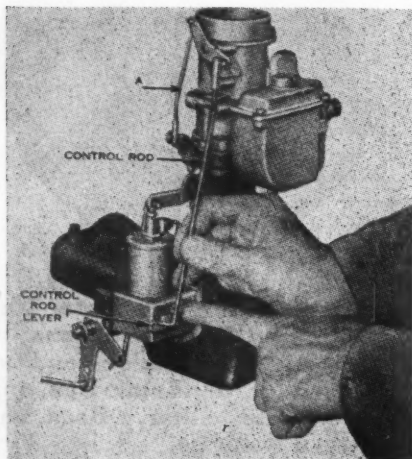
ON SHARP TURNS

I have in my shop a Dodge Victory 6, 1928, with oil pump trouble. The pump will work at 45 lbs. any time except when making a right hand corner and curve. Then, the pump drops to zero. When the knocking occurs, she will knock until the car gets straightened up again, then the pump works O. K. Pump, lines, etc., have been checked and are O. K. The car operates the same with fresh oil. Oil screen, gears are O. K. F. M. Buxton, Buxton's Garage, 308 13th St., Point Pleasant, W. Va.

THIS condition is undoubtedly caused by centrifugal force throwing the oil away from the pump intake. It can be corrected by building baffle plates in the oil pan so that the oil pump will be submerged in a well of oil. The only point you have to watch in installing these baffle plates is to be sure that a small amount of space is left between the edge of the baffle plate and the bottom of the oil pan to allow oil to enter the well. If there are already baffle plates in the oil pan running crosswise of the pan, it will be necessary for you to only install one plate running from front to back in order to form the enclosure or well for the oil pump to prevent the oil from surging away from it when the car turns sharply to the right.

ADJUSTING THE AUTOMATIC CHOKE ON '35 OLDS

I will be grateful to you if you can supply information that will help me in a difficulty I have as follows:



Your Queries

Mechanical
Technical
Selling
Building
Legal

You ask 'em—we'll do our best
to give you the answers.

I have a 1935 Oldsmobile six on which the automatic choke has been troublesome. The original choke at times would not choke and by freeing up all levers both on choke and carburetor, it operated O. K. with exception that it kept closed too long. The motor would roll and just send out black smoke for a long time. It would take about half hour before the choke would open to normal condition. I inquired of the local United Motors Service station and they informed me that the only thing to do was to replace the choke unit with a new one, which I did. But the new unit acts just about the same. It stays closed entirely too long. H. T. Hopkins, McClellandtown Auto Co., McClellandtown, Pa.

THERE are two conditions that might be responsible for this trouble and the first one is the length of choke control rod, which is the rod

that runs from the choke operating lever up to the choke valve shaft lever. If this control rod is too short, the initial and part throttle running mixture will be too rich, which is apparently the condition in your case. I would suggest that you remove the control rod from the operating lever and lengthen it one or two turns by screwing it out of the ball socket at the top. With the choke valve closed and the choke operating lever held in the extreme down position, the choke control rod should be adjusted so that it will fit into the notch in the operating lever. In extreme cases, it might be advisable to lengthen the rod so that it will fit in the hole in the operating lever rather than in the notch.

The second point that might be responsible for this trouble is the choke valve sticking in the throat of the carburetor. You will notice that there are two collars, one on each end of the choke valve shaft, and these collars are held in place by set screws. Loosen the screws that hold the choke valve to the choke shaft and then loosen the set screw in the collar on the outside of the choke shaft. Adjust the collar so that there is .003 of an inch clearance between the collar and the boss on the carburetor. Tighten the set screw in the collar and then tighten the screws that hold the choke valve to the choke valve shaft. Then, loosen the set screw in the collar on the engine side of the choke valve shaft

and adjust it so that there is .003 of an inch clearance between that collar and the carburetor boss. Then, tighten the set screw in the collar.

All of the linkage of this automatic choke assembly must operate freely and must not be oiled. Check particularly the fast idle cam lever to be sure that it is not sticking and that the rod connecting it to the choke valve shaft lever is not binding. The fast idle lever must fall freely of its own weight.

THE MEANING AND PURPOSE OF CAMBER

Please explain the meaning of camber, and why it is necessary to an automobile. A Texas Subscriber.

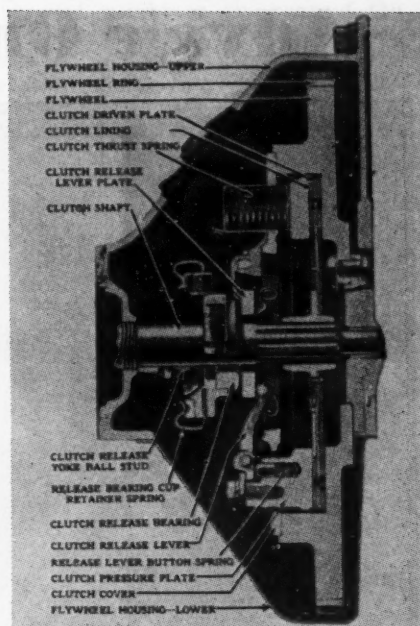
CAMBER is the distance the top of the wheel leans outward from a vertical position. In other words the front wheels of an automobile do not stand straight up-and-down, but lean away from the car. The downward pull of the weight of the car is exerted lengthwise of the king pin, the load being carried on the king pin thrust bearings. If the wheels were exactly vertical there would be considerable side strain on the king pin, in addition to the downward thrust of the weight of the car, and the car would be hard to steer. By tilting the wheels out at the top, the point of contact of the tire with the road is moved inward nearer the point at which the weight of the car is supported, which is an imaginary line drawn through the center of the king pin down to the road surface. This removes the side strain from the king pin, and makes the car easier to steer.

OIL LEAK CAUSES CLUTCH TROUBLE

We have a 1930 Marquette with which we are having clutch trouble. We have put three new linings in within the last 10,000 miles and each time the clutch has gradually started to slip until it becomes so bad it can hardly pull itself. It works good until the man takes a long trip. He drives very fast and the linings are full of oil. We have taken up the bearings and put in new gaskets in the rear bearing. Lewis Johnson, Lorens Auto & Implement Co., Center City, Minnesota.

IT seems to me that this trouble is not confined to the clutch, but is rather due to oil leaking from the engine into the clutch housing and damaging the clutch facing. Rather than continue to replace clutch plates, it seems to me that the thing to do is to locate and eliminate the source of the oil leak. There are two places from which this oil might be coming and one of them is the plug at the rear end of the camshaft. If this plug is leaking, oil will be forced around it and down into the clutch housing.

The other point to check is, of course, the crankshaft rear bearing. This bearing was originally fitted with shims to provide adjustment and I am wondering whether the shims have all been removed and the bearing cap filed in an effort to tighten the bearings. If this is the case, the bearing is now oval instead of round and, of course, will allow oil to pass by the sides of the bearing in a quantity greater than the



rear bearing oil retainer can handle with the result that some of it will leak past and enter the clutch housing. When a bearing gets in this condition, there is nothing that can be done with it except to replace it with a new bearing.

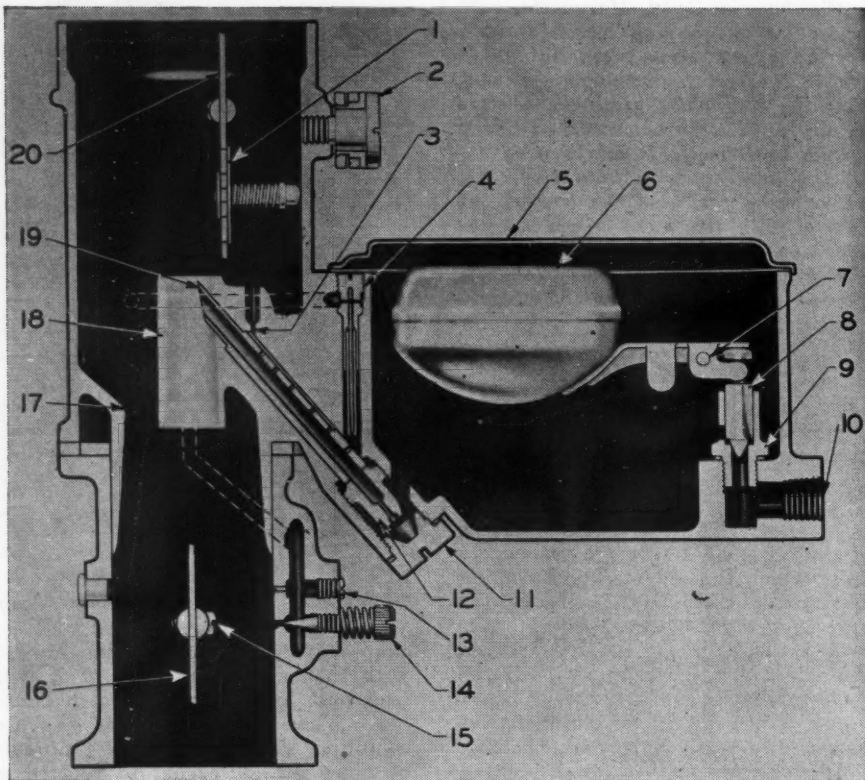
When this is done, it is always advisable to check the shaft with a micrometer to be sure that the shaft itself is not out-of-round. If the shaft is more than .002 in. out-of-round, it will have to be turned down and an undersize bearing fitted before you will be able to secure a tight bearing. I would not be at all surprised if this condition existed in this job due to the fact that the car has been in service for six years and, as you state in your letter, the owner is a fast driver. There is only one way to correct a condition of this kind and that is to do the job right which means that it should be set up as near as it was when the car was new as it is possible to do. No amount of fitting of new bearings and installing oil seals will produce a permanent job. I realize that the owner may not feel like spending the money necessary to properly fix the car, considering that it is six years old, but, nevertheless, if he is to expect normal life from the clutch facings and normal oil consumption, this oil leakage will have to be stopped.

When you need help
Write

**Reader's
Clearing House**



Advice On Adjusting Carburetors



INSTALLING RODS AND PISTONS IN OLD MODEL

I have a Peerless Six, Model 80, second series, serial No. B-802190, Motor No. 8-13132-1928 Model.

Will you please advise me as to which side of the motor the connecting rod numbers should be when the rods are correctly installed? Also, if there is any difference on which side of rod the wrist pin lock screw is located? I have been advised that you can give me this information. Frank A. Lewis, 641 Berryman Ave., Danville, Va.

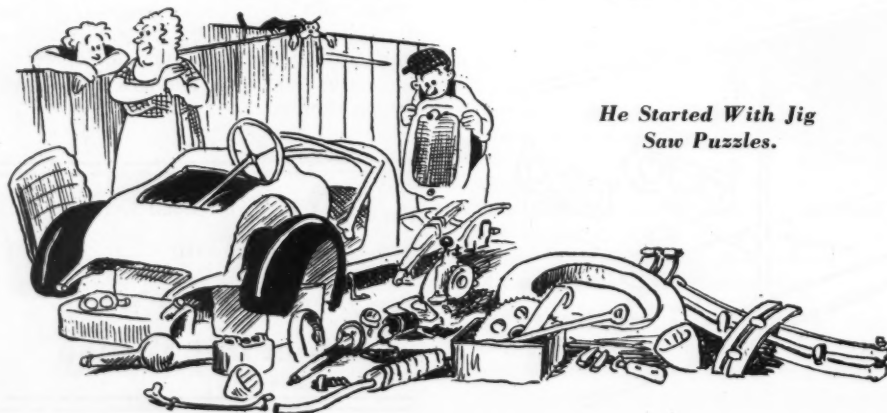
THE numbers stamped on the connecting rods should be toward the camshaft side of the engine when they are installed. The pistons should be installed with the piston pin lock screws toward the rear of the engine.

READERS' CLEARING HOUSE An Automotive Institution

Bill Toboldt, who for the last decade has managed this "meeting place" for repairmen and their problems, welcomes the ever increasing number of letters and invites all repairmen to write him.

Today, "Hank" Hankinson, technical editor, lends a helpful hand in conducting the Readers' Clearing House.

These expert trouble shooters can help solve your problems. When writing, please use your business letterhead or attach a business card to indicate your connection with the automotive trade. Name and address will be withheld from publication on request.



He Started With Jig Saw Puzzles.

WANTS INFORMATION ON CARBURETOR

Will you please send me instructions for adjusting carburetor on a 1932 Nash, Model 1060? Vincent C. Schwoyer, 3139 87th St., Jackson Heights, New York, N. Y.

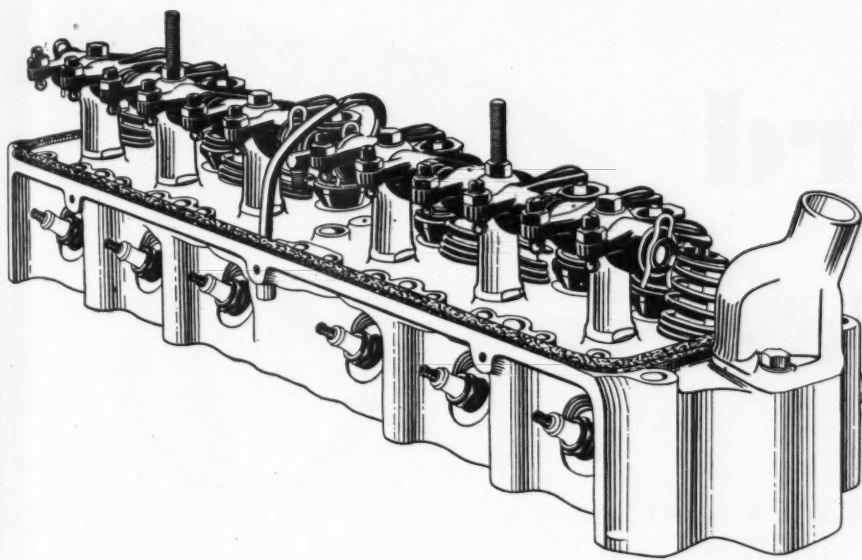
THE adjustment on this carburetor is for idle speeds only, the intermediate and high speed adjustment being controlled by fixed jets. Since the idle adjusting screw controls gasoline, turning the screw in produces a lean mixture and turning it out produces a rich mixture. The gasoline level in the float bowl should be 9/16 in. from the top of the bowl, measured with the cover removed and with the engine running. The fuel level is adjusted by bending the float arm.

If you are unable to secure a good idle, remove the idle adjusting screw No. 14 and the idle air bleed plug No. 13 and check to see that the passages are clear and are not choked with carbon. Also remove the plug No. 4 and check the idle tube for being clear and be sure that the throttle valve fits properly in the carburetor body.

The accelerating pump has two positions, the hole giving the short stroke being used for summer driving and the hole giving the longer stroke being used for winter driving.

MAY BE CAUSED BY DRY VALVE STEM

I would like to hear your opinion of a little trouble I am having with a 1932 Chevrolet. This car had a peculiar heavy knock in it. I figured it out to be a piston slap so to make a long story short, the owner had just had the valves ground so I pulled the head and pan, found no loose piston or scored walls, so pulled the piston and rods. The babbitt in a few of the rods fell out in small pieces so I put in all new rods. Had the pistons tinned and put in new rings. The car has just had new points and plugs. It ran fine, but a month later the owner drove up with the motor knocking just as badly as before. After racing the engine a little and letting it idle, the knock seems to go away, but will come in again after driving a bit. The clearances of the piston and walls were miked and were not bad—.003 to .005 out; this is a cam job. The owner did not use a great quantity of oil before the job was done. The noise appears to come from the rear of the motor. Could this be a main? I did not pull them down. Albert Bacharach, 438 Sedgely Ave., Philadelphia, Pa.



THE only point that I can think of that seems to apply to this case is a noise caused by a dry valve stem. You no doubt know the 1932 Chevrolet rocker arm shaft is drilled for forced lubrication of the rocker arm bushing. My suggestion would be that you go to some accessory supply store and purchase four valve stem oilers which are installed under the cap screw holding the valve rocker arm shaft bracket. These oilers consist of a piece of metal which is attached under the cap screw and on the outer end of the metal are two pieces of felt which rest directly over the rocker arm at the valve stem end. The action of the rocker arm bumping the felt squeezes out a certain amount of oil which runs down the valve stem. I believe the installation of these oilers will correct the difficulty you are having.

OVERHEATING CAUSED BY LEAN MIXTURE

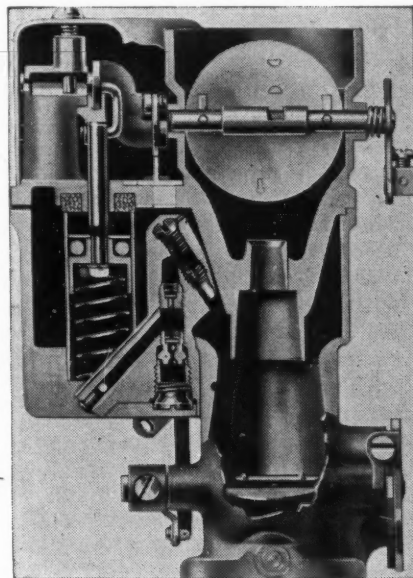
I understand that the carburetor heat control on the 1933 Master Chevrolet is automatic. I have a 1933 Chevrolet in my shop that takes a long time to warm up. I have to use the choke for several squares but after it has been driven far enough to get the engine warmed up, it runs O. K. without using the choke.

The cylinder head on this 1933 Chevrolet has little cracks across three of the exhaust valve seats. I think the engine has been run on too lean a mixture causing it to get too hot as the engine was a white color in the combustion chamber. Do you think these little cracks will ever start leaking?
John Ross, 928 Pine St., Springfield, Ohio.

YOUR description of the difficulty in getting this engine warmed up leads me to believe that the trouble is due to too lean a mixture being delivered by the carburetor. This is further borne out by the fact that the exhaust valve seats are cracked and the inside

of the cylinder head bears evidence of having been operated too hot.

While the manifold heat control would, of course, have some effect on the period of time required to warm



up the engine, I do not believe it would affect it to the extent mentioned in your letter. However, it would be a good plan to check this heat control valve to be sure first, that the valve is free to operate and is not frozen in the manifold and second, that the thermostat spring is properly connected and is operating. The heat control valve shaft which is mounted in the exhaust manifold has a tendency to stick or seize on the back side of the manifold next to the engine. Sometimes a little penetrating oil or rust resisting oil will free it up so that it will operate as it should. If it happens to be stuck in an open position so that all of the exhaust gases are directed around the intake manifold constantly, the job would have a tendency to run hot. On the other hand, if it happens to be stuck in a closed position which means that the little

arm and weight on the rear of the manifold would be in its full down position, you would experience somewhat the condition you describe. The heat control spring cover should be removed from the outside of the manifold and the spring checked to be sure that it is not broken and that it has sufficient tension to operate this valve.

The hair cracks in the exhaust valve seat bear out the belief that the job is being operated on too lean a mixture. It is a pretty safe bet that these cracks will spread as time goes on and will eventually cause the valves to leak. If they are not too bad, it is sometimes possible to grind them out by using a valve seat grinder and grinding the valve seats deeper in the head. There is not very much material in the head at the valve seats to permit an excessive amount of grinding, however, and if the cracks are very deep, you may run into the water jacket before you completely grind out the cracks. Then, of course, you would have to buy a new head. Considering the fact that this is a 1933 model and that it is a pretty safe bet that these cracks will develop trouble in the future, I would say that the grinding operation was certainly worth trying.

Getting back to the lean mixture as being the original cause of the trouble, I would suggest that you check the carburetor metering rod to be sure that you have the right one. The standard metering rod is stamped with No. 62-45 and the lean metering rod is stamped with No. 63-47. If the metering rod now in the carburetor is the lean one, my suggestion would be that you remove it and replace it with the standard metering rod using a metering rod gage to be sure that the rod is properly located in the carburetor. If you do not have a gage, one can be secured either from the Chevrolet dealer or from the Carter carburetor dealer. To my mind, checking this metering rod should be the first operation on this car as I believe this is the source of the whole trouble.

SPECIAL generator pulleys have been released for service of the Chevrolet Standard $\frac{1}{2}$ -ton and $1\frac{1}{2}$ -ton jobs. Part No. 602229 pulley is $\frac{1}{2}$ inch larger than standard, and will result in changing the generator maximum output to a higher driving speed. Part No. 602243 pulley is $\frac{1}{2}$ inch smaller than standard, and will change the maximum generator output to a lower driving speed.

Don't Cuss Write Us!

Packard

Adds New

**1937 Line Will Include Four Cars—
the New Six, the "120", a New
Super-Eight and the Twelve**

By Joseph Geschelin

WITH the addition of the widely discussed new 37/16 by 4 $\frac{1}{4}$ in. six mounted on a 115-in. chassis to its line, Packard, for the first time in its history, has a line of four cars which blanket practically the entire range of automobile requirements of price and size. The line comprises the new Six, the 120, the Senior line consisting of an entirely new Packard Super-Eight, and the Packard Twelve.

Wheelbases on the new line are as follows: Six, 115 in.; Model 120, 120 in., standard; 138 in. for seven-passenger sedan and seven-passenger limousine; 158 in. for hearse and ambulance; Super-Eight, 127, 134, 139; Twelve, 132, 139 and 144 in. Complete specifications are given on pages 66-67.

Considering first the power plants—the new Packard Six is six-cylinder, L-head, 37/16-in. bore x 4 $\frac{1}{4}$ -in. stroke, 237 cu. in. displacement. It is rated 100 hp. at 3600 r.p.m., with cast iron head and compression ratio of 6.3 to 1; aluminum head with 6.75 ratio is optional.

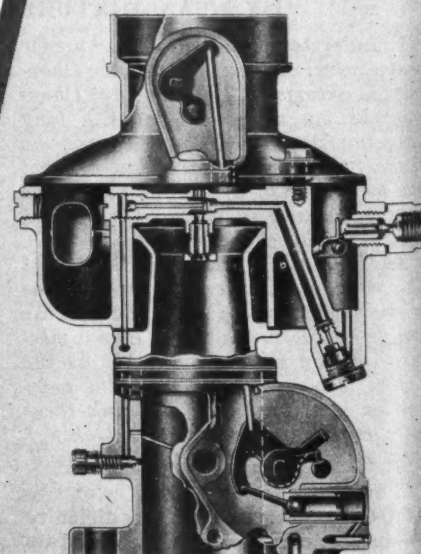
Many of the production operations will be performed on the same equipment as for the 3 $\frac{1}{4}$ x 4 $\frac{1}{4}$ -in., 282-cu. in., 120 engine. The latter continues unchanged except for details.

Bore stroke and wheelbase of the new Super-Eight are the same as the previous series Eight. However, power has been increased

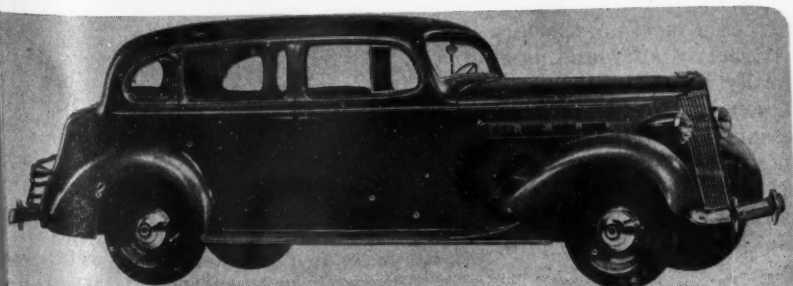
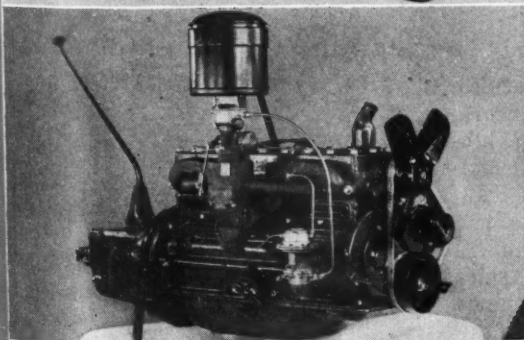
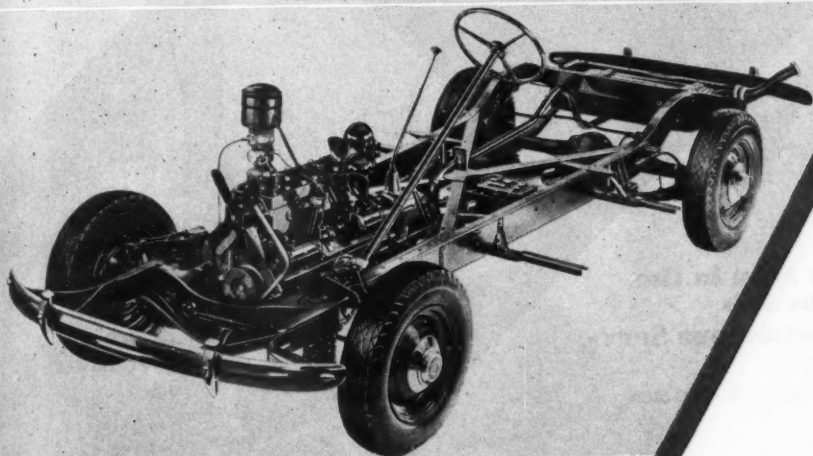
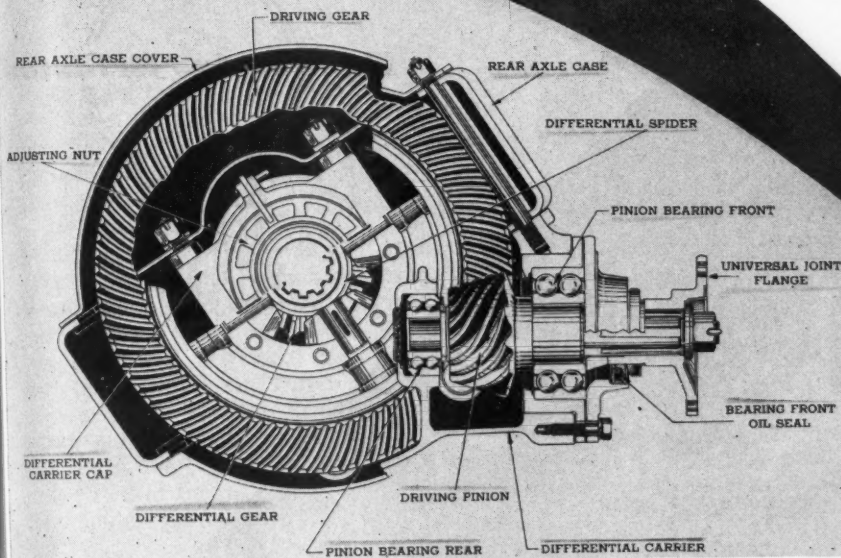
from 130 hp. at 3200 r.p.m. to 135 hp. at 3400 r.p.m. As the result of design refinements, the new Super-Eight is approximately 250 lb. lighter than the previous Eight. The Twelve remains the same as before with numerous refinements—modified L-head, V-type block with cylinders set at 67-degree angle. It is rated 175 hp. at 3200 r.p.m. Aluminum head is standard with standard compression ratio of 6.4 to 1 and optional ratios of 6.0 to 1 and 7.0 to 1.

Many mechanical features are to be found on each of the four lines. For instance: hypoid rear axles throughout; the same axle is used on the Six and 120; Safe-T-Flex front spring suspension developed for the 120 now on all models, interchangeable on the Six and the 120, heavier for the Senior line. Sway bars are used at the rear on all models; front and rear on the Twelve.

Hydraulic brakes with Centrifuse drums and Packard dust seals are standard. On the Twelve the braking system is augmented by vacuum power in conjunction with a reservoir tank to permit



Hypoid rear axle reduction gears are found on the entire Packard line. The new Packard Six chassis. Wheelbase is 115 in. Note the I-section, X-type cross-member, the independent suspension system. 100 hp. at 3600 r.p.m. is developed by the new 237 cu. in. six-cylinder engine. Lines of the new, low-priced Packard Six follow closely those of the larger Packards. (Opposite page) Details of the Chandler-Grove carburetor used on the Six



operation when engine is stopped. All models feature improved throttle action. On the Twelve, clutch pedal is also power-actuated, and pressure has been increased slightly over last year to reduce

sensitivity, and the Senior line has been treated to additional anti-friction bearings in the clutch and brake system.

Welded frame construction featuring a welded I-beam section (as contrasted to channel members) for the X-frame member is carried through the entire line, providing 400 per cent additional torsional stiffness on the Senior chassis.

Selective silent synchro-mesh transmission with helical gears is standard. Only two sizes of steering gears are used—one for the Six and 120 lines, the other for the Senior cars. All models have center-point steering.

Electrical systems have been improved. All engines feature 10-mm. spark plugs having a very narrow range of temperature variation so that a universal plug is standard. Delco-Remy equipment on the Six and Auto-Lite on the 120 have full vibrator voltage control. Delco-Remy shunt-wound generators with voltage-current control are standard on the Senior line. Hi-level batteries requiring attention only a few times a year, which proved so successful last season, are continued on all former lines. Light circuits now are

(Continued on page 64)



Seven Keys



(Above) Floor manager attempts no high-pressure selling, merely analyzes all of the customers' needs, makes his recommendations from that analysis.

(Right) The right selling timber—clean, efficient and intelligent—capable of selling merchandise and service to women customers.

- 1—Complete Service**
- 2—Modern Equipment**
- 3—Trained Personnel**
- 4—Cleanliness**

- 5—Right Man in the Right Job**
- 6—Instantaneous Service**
- 7—Customer Contact**

BEHIND the annual million dollar sales volume of the Commercial Tire Co., Seattle, Wash., maintenance firm, is the story of seven "keys" to service profits.

This is an analytical study of that maintenance shop, known throughout the West not only because it is a highly successful business but also for its length of service to car owners. Commercial Tire has been at it since 1917.

The first key to successful selling is *Completeness of Service*, making possible more diversified selling and greater profit opportunities. A million dollar sales volume is built around this set-up: tires, brake service, wheel alignment, shock absorber service, engine tune up, engine overhauling,

auto radio installation and service, battery sales and electrical work, body work, painting, washing, lubrication, a complete stock of quality parts, gasoline and oil.

"The maintenance business has grown up," comments Frank L. Hawkins, vice-president and sales manager. "Modern maintenance merchandising is in step with the newest trends of business—that of giving the utmost in service in clean, attractive surroundings."

Naturally to sell this huge volume of service *Modern Equipment* is necessary to do the job. Every department at Commercial Tire is efficiently equipped—and that equipment is displayed to merchandise the service it was built to perform.

(Above) Instantaneous service aided by means of a pneumatic tube system. In addition to this there is an inter-departmental telephone system.

(Right) Illustrating the cleanliness factor in Commercial Tire service merchandising.

Keys to Service Profits

The third key, and one of the most important is the *Training of Personnel* — showing Commercial Tire employees what they are expected to do in working and in selling.

Mr. Hawkins says, "In our salesmanship schools, conducted for every department, every week, is a special classroom provided for that purpose, we train on a four-point program, and the first factor we stress is *Cleanliness*. Our next consideration is *Selling Timber*. We make sure that we have employed the right men, then develop them. The third is *Instantaneous Service*. The fourth point is *Customer Contact*."

How this four-point plan is carried through constitutes the method that has built a million dollar maintenance business!

Therefore, the fourth "key" in their successful sales plan is *Clean-*

liness. All the men, whether on front line service or not, wear clean, white uniforms. Every tool, every piece of equipment has its place and must be in its place. It is almost as much a disgrace for a department head to have a cluttered department as a slumping sales volume!

The fifth "key" is found in the selection of the *Right Selling Timber* and the development of an alert personnel. There are 140 Commercial Tire employees and it is an interesting point that the average length of employment is seven years, which means that the 10, 15 and even 18 years of employment is balanced by newcomers to the staff, added to take care of increasing business. The wage scale is said to be 10 to 15 per cent above the average. Each department head works on a salary and bonus, based on the gross earnings of his department.

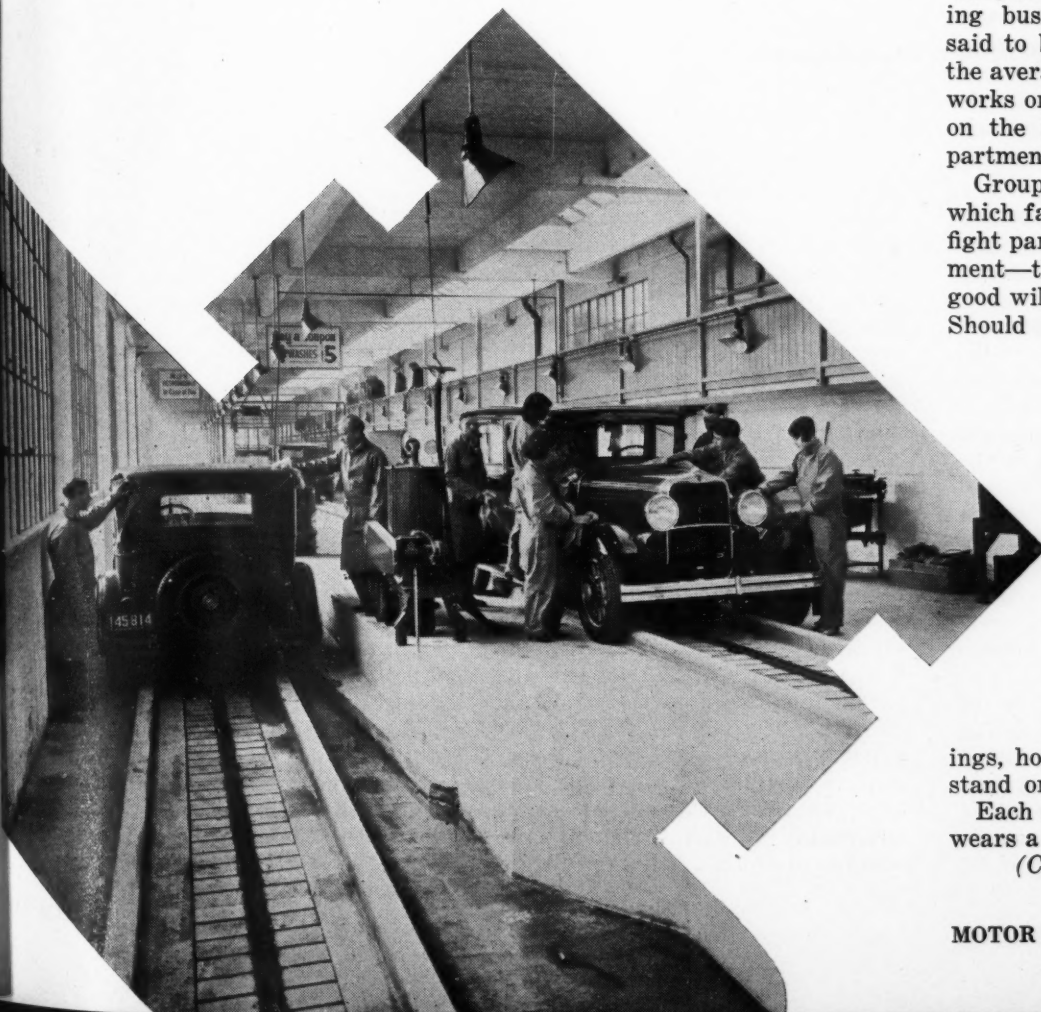
Group dinners, picnic events in which families are included, a prize fight party paid for by the management—these are ways in which good will among employees is built. Should an employee get into a "jam," such as illness in the family or anything else unavoidable, which calls for extra funds, he is loaned the money by the management, without interest.

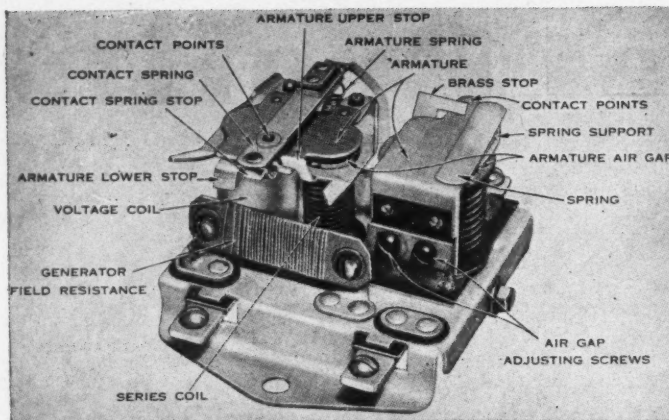
Department heads are taken into the management's confidence as to balance sheet figures, departmental earnings, how the relative departments stand on the volume ladder.

Each employee, however obscure, wears a name badge. Furthermore,
(Continued on page 65)

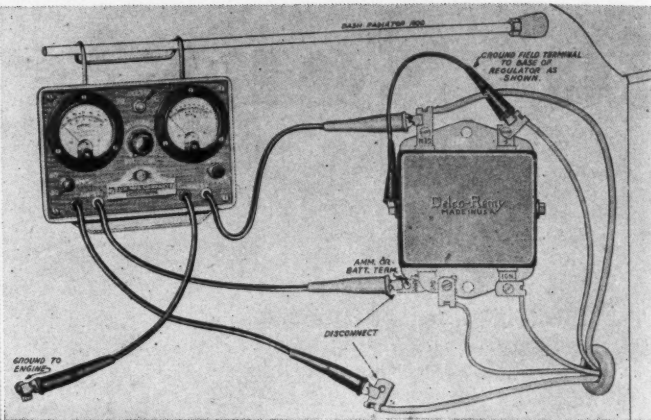


A general view of the Commercial Tire Company's maintenance plant, a shop that welcomes a million dollar sales volume annually.





Voltage regulator and cut-out relay.



Hook-up of volt-ampere tester to determine generator output.

Battery Life Depends on Voltage Control

Increased Load on Battery Requires Accurate Knowledge and Control of Generator Output

By Robert Hankinson

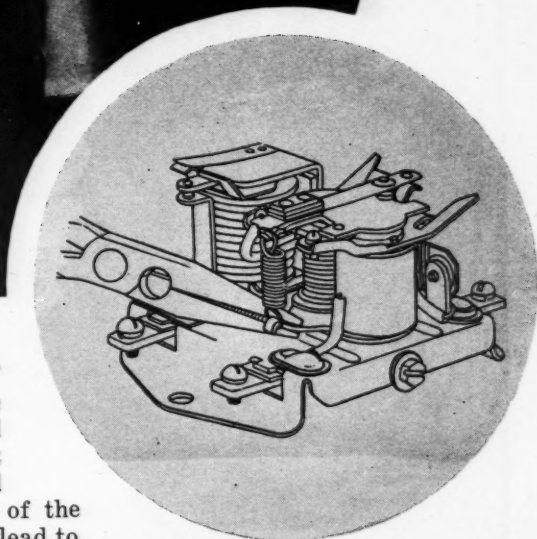
A FEW years ago it was necessary only to shift the generator third brush to vary the generator charging rate to the battery, but the increasing popularity of radios and other electrical accessories on cars has given rise to the problem of supplying a sufficient amount of current to take care of the additional load placed on the battery. This has resulted in the introduction of higher-output, air-cooled generators, batteries of larger capacity, and voltage control units to regulate the amount of charge delivered to the battery so that it will not become overcharged when the excess voltage is not required.

There are two general types of voltage control units, one being known as the "step" type, and the other as the "vibrating" type. The main difference between the two is that the "step" type unit consists of a set of relay points that open

at a predetermined high voltage, cutting a resistance unit into the field circuit to prevent an excessive charge to the battery. The points close at a predetermined low voltage which cuts out the resistance unit and allows the full generator charge to reach the battery. The generator used in connection with this type of regulator is usually provided with an adjustable third brush so that the output can be varied, and a corresponding adjustment be made to the regulator. The "vibrating" type, as the name implies, consists of a set of relay points that are vibrating constantly, cutting the field resistance in and out rapidly, which tends to hold the charging voltage at a steady value. The generator used with this type of unit is usually of the peak load type, on which the output is not adjustable. Variations in the amount of charge delivered to the

battery are accomplished by performing several specified adjustments to the voltage control regulator.

When it is decided that the battery is not receiving a sufficient charge to operate the various electrical units, it is first necessary to determine whether the fault lies in the generator or in the control unit. Therefore, the first step is to test the generator output, and if that is found to be satisfactory, then test the operation of the voltage regulator.

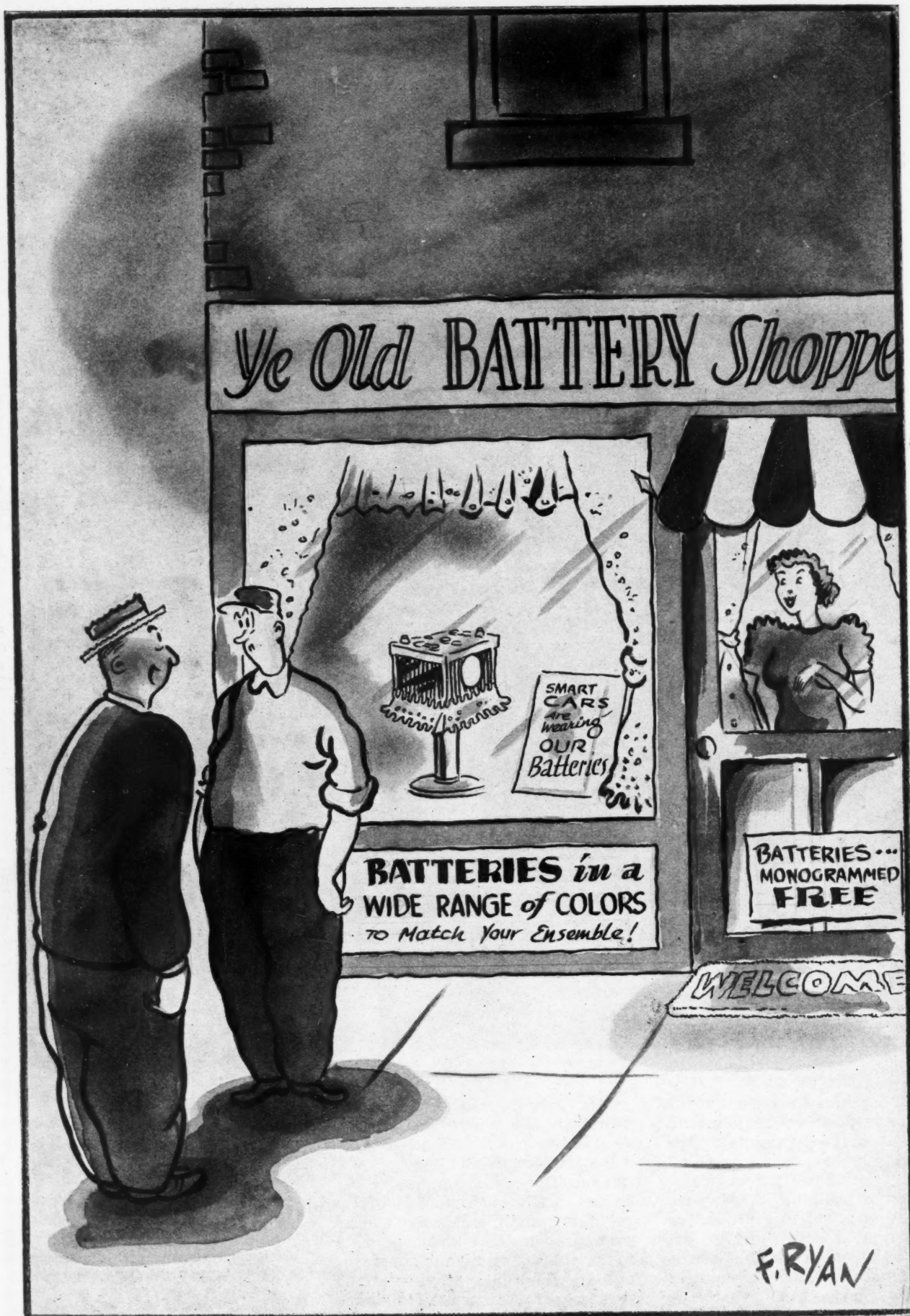


Adjusting the regulator by bending the armature spring hanger. Increasing the spring tension increases the voltage.

When checking the output of the generator used in connection with the vibrating type of regulator, the first step is to ground the "F" (field) terminal of the regulator either by installing a jumper wire from the terminal to a ground or by touching a screw driver between the terminal and the base of the regulator. Then disconnect the lead from the "BAT" (battery) or "AMM" (ammeter) terminal of the regulator, using a Volt-Ampere Tester, connect the positive am-

meter lead to the "BAT" terminal, and the negative lead to the wire disconnected from that terminal. Connect the positive voltmeter lead to the "GEN" terminal of the regulator, and the negative lead to ground. Set the engine speed up to the point of maximum generator output, which is approximately 30 to 35 m.p.h. Adjust the resistance in the tester to read 8.2 to 8.5 volts, at which point the generator will show to be charging approxi-

mately 20 amperes. If the generator does not show that rate, sand
(Continued on page 86)



"How's the battery business, Charlie, since your wife took over the shop?"

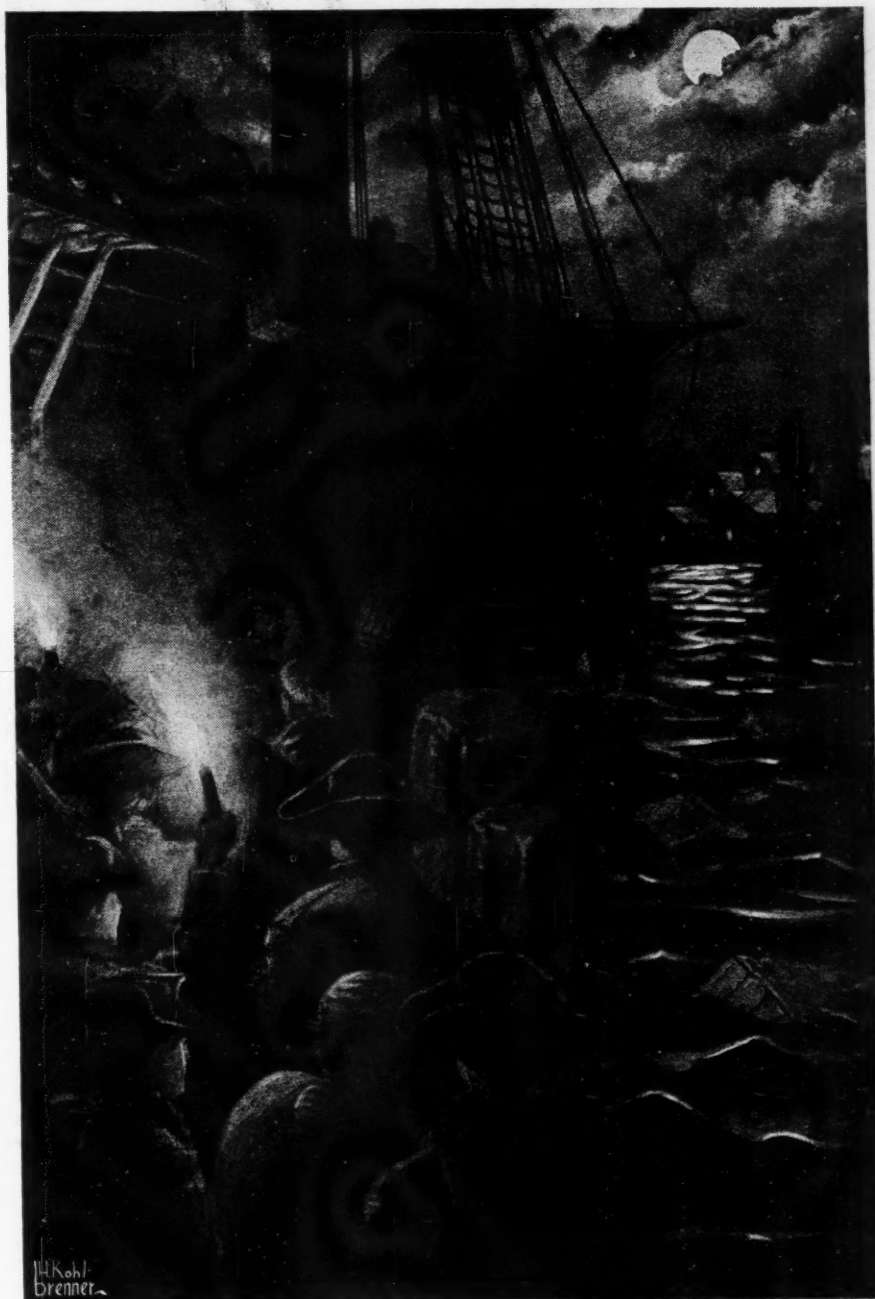
By Julian Chase

AS Bill Brown, all-around trouble shooter, stepped into the office of Robinson's garage and independent service station, he heard his boss grumbling to a friendly visitor about taxes. "More and bigger taxes, always more and bigger taxes," the boss said. "These fellows who spend our money seem to think there is no limit to the amount of taxes they can pile on us. It's got where a man in business can't make a decent living. They tax my garage, my home, my income, almost everything I sell and now they're going to tax my payroll. Good Lord, where is it going to end?"

And when Bill heard that, he said to himself, "That's one way in which I have it on the boss. I don't have to worry about taxes." He didn't own any real estate and, with his exemptions as a married man with children, he escaped the income tax. "I don't have to worry about taxes," he thought again as he went out to tackle the next job.

Bill was living in a fool's paradise. Perhaps he didn't worry about taxes but he should have, nevertheless. Even though he didn't realize it, just about 33 cents of every dollar that he spent to keep himself and his family alive and to give them a moderate amount of pleasure, went to pay taxes. He paid taxes when he paid rent. He paid taxes when he bought food, clothing, everything. When he bought a loaf of bread he was paying 53 different taxes. Yes, Bill paid them all. He was the ultimate consumer and the ultimate consumer is the chap who pays the taxes whether he knows it or not.

Of the 53 taxes which Bill paid when he bought the bread, the farmer who raised the wheat had previously paid six and passed them on in the price of wheat, the grain elevator had paid six and passed them on, the flour mill had paid five and passed them on, the railroad had paid 11 and passed them on, the trucker seven, the wrapper manufacturer seven and then the baker, paying all previous



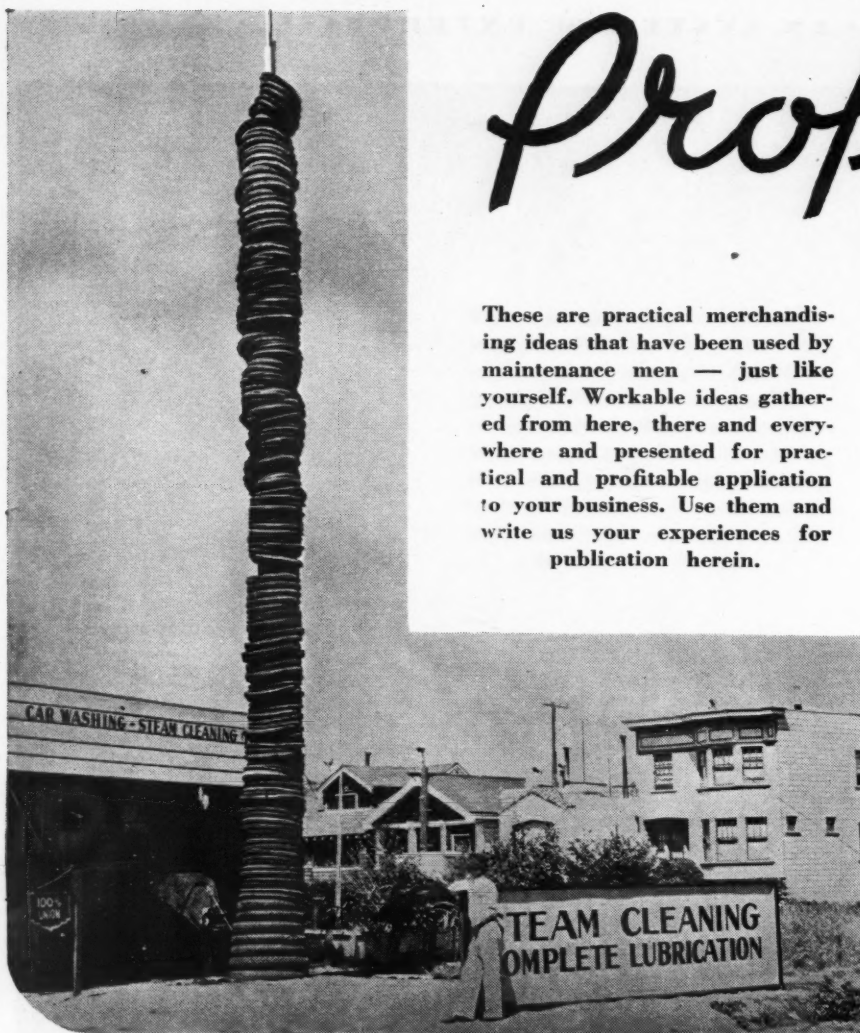
Taxes—Our National Headache!

taxes in the prices he paid for his raw material, baked the bread, paid 11 additional taxes and then passed all 53 of them on to Bill when Bill bought his loaf. What Bill paid for his bread was actual cost plus taxes and taxes were 20 per cent of the price.

Bill smokes cigarettes and pays more than three times as much for

them as he would have to pay if it were not for the taxes that are paid all along the line from the tobacco fields to the tobacco shop where he buys them. And so it is with everything that Bill or anyone else buys. His money would buy for him half as much more than he now gets if there were no taxes.

(Continued on page 68)



Profitable Ideas

These are practical merchandising ideas that have been used by maintenance men — just like yourself. Workable ideas gathered from here, there and everywhere and presented for practical and profitable application to your business. Use them and write us your experiences for publication herein.

By Frank P. Tighe

A Million Miles of Road Service Piled End To End

S. F. Patton, owner of the Paramount Service Station, San Francisco got an idea that stopped customers when he began collecting a large number of worn-out automobile tires and piling them up in front of his washing and greasing station. See photo on the left.

The stunt has proved to be good advertising. Thousands of motorists pass the place daily, for it is on the main highway southward. Quite a few of them stop to count the tires and speculate on how he gets them over the pole, since there is no rope to the top. You can mention the display to almost any motorist in San Francisco and he will recall having seen or heard of it.

Mr. Patton says there are about 150 tires in the pile, and he estimates that they have seen more than a million miles of road service.

\$\$\$

Building Rural Business

A BULLETIN board is a rural salesman for J. H. Kennedy, owner of the Central Service Station, Bonn, Ohio. Kennedy takes advantage of country folks' method of exchanging merchandise, and erected a 5-ft. slate on the outside front wall of the station, upon which farmers were asked to write their needs. An average of one hundred farmers call daily to write and read messages on the board, and, quite naturally, a big percentage of these persons patronize the shop. No charge is made for listing messages, and the arrangement is prepared thus:

Advertising Service for Farmers

Want to Buy Want to Trade Want to Sell

.....

"A large part of a farming enterprise consists of buying, trading,

A Big Wash

THE auto laundry department at the Sixth Street Service Station, Reading, Pa., has been developed through well-planned promotions and service features until it has become one of the most active parts of the business.

The number of cars washed varies, but the average is about 1000 cars a month. The peak business registered in one month was 2000 cars. Many of the cars that pass through the auto laundry required some additional service.

Saturday and Sunday of each week is the peak period for car washing, and the problem at this station has been the development of a plan to reduce this peak load and spread the business more evenly over the other days of the week. Some progress has been made in this direction by establishing a different schedule of prices for slack and rush periods. A car that will be washed for one dollar on Saturdays will be washed for 75 cents on Tuesday or Wednesday.

Before this discount plan was adopted it was not unusual to have 150 to 200 cars pass through the wash room on a Saturday, and as many more on

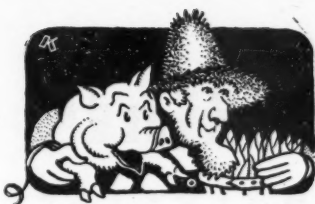
a Sunday, in some instances raising the washing business for the two days to 75 per cent of the weekly total.

The management hesitated for some time to announce the price change, fearing that it might cause customers to take their cars elsewhere, but when it was found that car owners could be induced to have their cars washed from Monday to Friday and were glad to make a small



saving, the plan was promoted more actively.

In explaining the methods used to build a profitable business, the service manager said: "While the sliding scale of prices has been useful in leveling out the extreme peaks of car washing business, I do not think that price alone is the most important factor in getting customers for this service. Quick service and good work are more important. We emphasize those points more than price."



and selling livestock, crops, and equipment," Kennedy declares. "Formerly, this dealing was done through group contact at the blacksmith shop or country store, but with the passing of these establishments many farmers were left without an advertising medium. We finally solved the problem by announcing an advertising service and letting the farmers help themselves.

"Within a week after our bulletin board was erected, hundreds of dollars worth of merchandise was being listed upon it. Farmers got the habit

of coming here to read the messages, and many of them wanted motor service, used cars, spare parts, gas and oil. Scores of regular customers first came to us in that way, and we are now bringing in business from practically every section of our territory.

"Our service requires no red tape, and no obligations to us. The farmer having a horse, plow, stove, or any other item for sale or trade, comes here and writes a description of the property on the board, under its proper heading. He also writes his name and address along with other necessary information, and the next farmer who reads it may prove a prospective purchaser. If so, he gets in touch with the writer and the deal is made. The writer then erases his 'ad'."

\$ \$ \$



Every Job An Advertisement

AMONG other money making ideas introduced by Arthur E. Smith, head of Smith & Gregory of N. Y., Inc., New York City independent operators, is the gadget they supply customers after installing power brakes or installing new brake linings. It is a combined safety signal, red light reflector and good will advertisement all rolled in one.

It is a small metal sign, five in. wide, painted yellow and lettered in black. The sign reads "Caution. Good Brakes by Smith & Gregory." It has two prongs which slide between license plate and plate holder and a glass reflector at the top. No trouble

getting customers to display this ad, they ask for it. And these little signs have brought in a lot of extra business, Mr. Smith claims.

\$ \$ \$

Get 'Em In Quickly— Movie Does The Rest

BY placing two of the three pump islands of their new up-to-the-minute service station at unusual

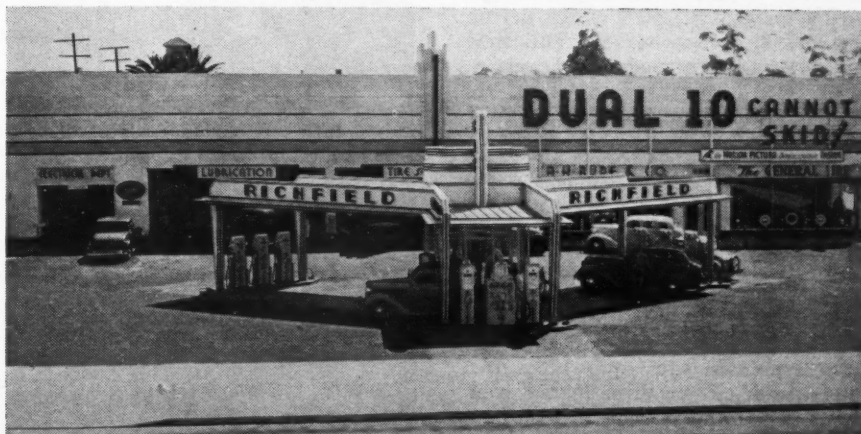
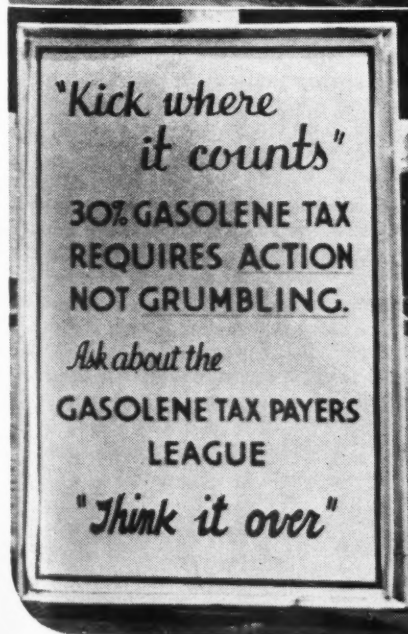
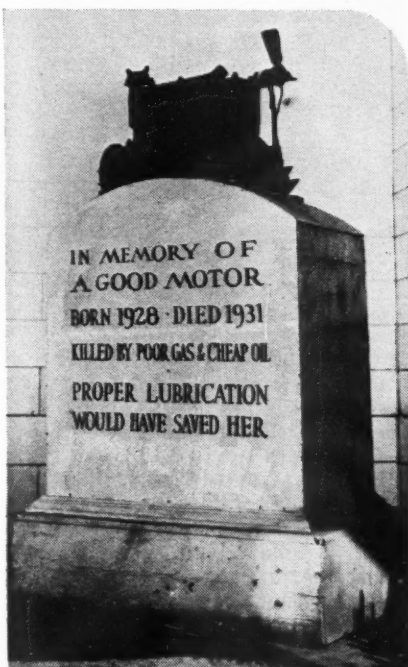


angles, A. H. Rude and Company have evolved a driveway system for their newest service unit in Hollywood, California, which eliminates traffic congestion at the pumps. Although there are four entering ramps from the three streets bordering the station, it is possible for a customer to drive to any one of the six places where his car can be serviced by the gasoline pumps without making any difficult turns or obstructing the exit of any other customer, regardless of which entryway he uses. See illustration at the bottom of this page.

Proof that this driveway system does eliminate congestion at the pumps lies in the fact that on the opening day of the station over 7000 gallons of gasoline were sold without any noticeable confusion or line-ups at the pumps.

In connection with an intensive tire-selling program at the new station, A. H. Rude and Company have installed a portable moving picture projection machine. Prospective customers are shown a special film which forcibly illustrates the merits of the tires which the firm handles. Experience has proved that the film not only illustrates and convinces a customer of the merits of the tire more readily than any spoken sales argument but it also actually reduces the amount of sales time required to make a sale.

(Left, above.) This tombstone, dedicated to a good engine gone wrong, was used to promote lubrication sales by Sabol Bros. Service Station, New York City. (Left, below.) To keep customers straightened out on the gas tax question, this sign appeared at a service station on Fifth Avenue, New York City.





Courtesy DeSoto Motor Corp.

Service Hints

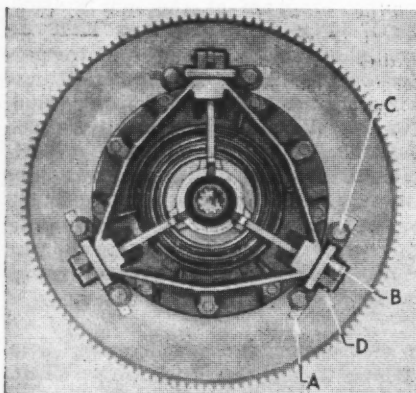
From the Factories

SPECIAL attention should be given to the manner in which the front wheel brake rubber tube is installed on the 1936 Studebaker models to prevent its contact with the wheel and tire. The rubber tube should be turned, in tightening, so that a slight twist will hold it in proper position as shown in the lower left-hand illustration.

WHERE overheating is experienced due to certain types of low speed operation such as door-to-door delivery, Chevrolet advises that a special fan pulley, Part No. 602269 with truck fan Part No. 837448, may be used. When installing this special pulley it will be necessary to grind the lower web of the water pump body to provide clearance for the pulley. This special pulley should not be used where car speeds exceed 30 m.p.h., because of excessive fan belt slippage and excessive water pump bearing loads at high speeds.

* * *

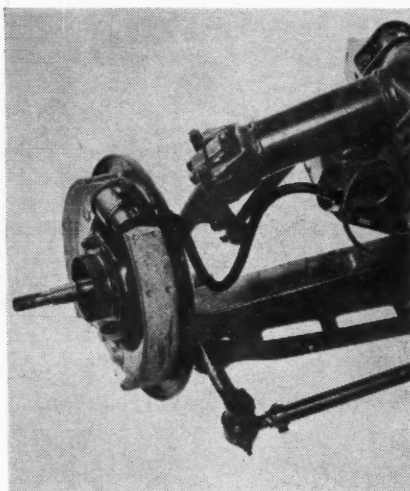
ENGINE torque that transmits a vibration to the body of the 1936 Graham models equipped with the



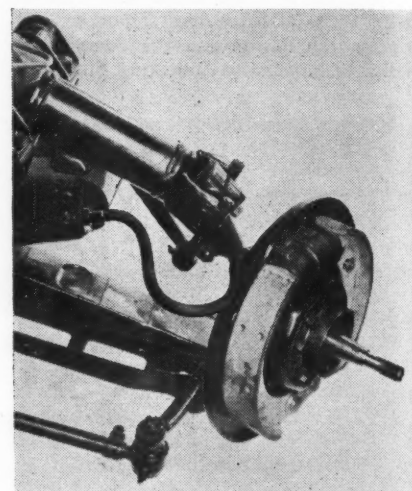
overdrive transmission may be modified by installing a new clutch driven member, Part No. 84238. This new part is now being used in production. If the overdrive transmission is removed from a new car and installed in a car not originally equipped with the overdrive, it is necessary to transfer the clutch plate also.

* * *

SETTING the ignition timing of the 1936 Studebaker models will be much easier if the timing mark on the flywheel is marked with chalk, and the flywheel painted with lamp black for a distance of two or three inches each side of the timing mark.



Right Method



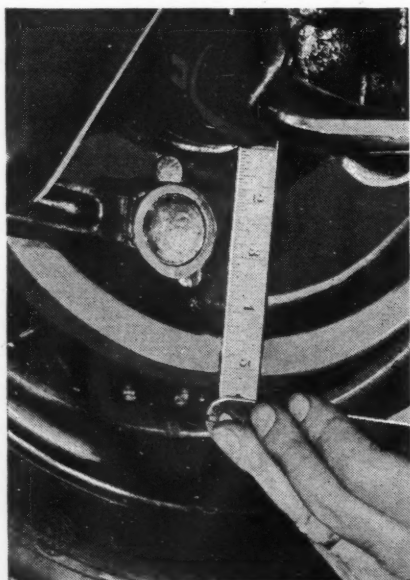
Wrong Method

THE correct adjustment of the knee action units of Chevrolet cars is as follows:

1934—5½ inches, plus or minus ¼ inch.

1935—5⅝ inches, plus or minus ¼ inch.

1936—4⅞ inches, plus or minus ¼ inch.



This measurement is made from the lower end of the king pin support to the lower edge of the brake flange plate, with the tires properly inflated and the car standing on a level floor. The adjusting plug may be ⅛ inch below or above the face of the housing cap, to obtain the above limits. The 1934 6-wheel jobs will set approximately ½ inch lower than the above dimensions, unless equipped with the long spring and cap to 1935 specifications.

* * *

CASES of overheating of the 1933, 1934 and 1935 Pontiac cars may be caused by the water distributing manifold being so rusted that it is no longer effective. This tube is inserted in the block between the cylinders and valve ports. In order to replace the tube it is necessary to remove the radiator and the water pump and fan assembly.

* * *

LOOSENING of the gear shift lever cap on all Chevrolet passenger cars from 1932 to 1936 may be corrected by the installation of a special lock washer, part No. 496914.

ROARING

EUROPEAN DRIVERS AT ROOSEVELT RACEWAY

Four or five teams of European cars and drivers will be entered in the International 400-mile inaugural George Vanderbilt Cup Race, at Roosevelt Raceway, Westbury, L. I., Columbus Day, Oct. 12.

Among those already entered are Tazio Nuvolari, Italy, of the Alfa Romeo team; Hon. Brain Lewis of England, and Jean Pierre Wimille, each of whom will drive a Bugatti.

"Babe" Stapp, of Los Angeles, is the first American entry to be announced. He will drive a specially built car, the "Topping Special," owned by Henry J. Topping, wealthy sportsman of Round Hill, Greenwich, Conn.

MIDGETS INVADE ENGLAND

English racing fans are about to witness the roaring, spluttering and skidding of midget automobile racing. Having studied the dodging doodle-bugs in America, E. O. Spence, manager of the Belle Vue Speedway, Manchester, England, has imported a flock of these small racers, intending to introduce the sport in England. The cars are exactly like those seen on many of the speed saucers here in America. Small jobs powered by four-cylinder two-stroke outboard motor boat engines.

Midget racing was attempted in London last year, but wasn't successful owing to the lack of suitable cars, reports state.

"Doc" MacKenzie at the Reading, Pa., Speedway with Frank Tighe, managing editor of MOTOR AGE



"DOC" MACKENZIE GETS FINAL CHECKERED FLAG

George M. "Doc" Mackenzie, Edgington, Pa., one of the most daring and colorful drivers ever to tool a racing automobile, met death in a Milwaukee hospital after a crack-up at the Milwaukee State Fair track, August 23.

The accident occurred when Mackenzie attempted to follow Billy Winn, of Detroit, as the latter cut inside of George Connor, of San Bernardino, Calif. Connor had swung wide in the first turn but his front wheel hooked Mackenzie's machine, and in a flash "Doc's" car crashed through the rail, turning over four times. Billy Winn drove on to win the 25-mile event.

"Doc" was well-known and well-liked by almost every one who knew him. A heady driver, who wore a Van Dyke beard during racing seasons, the "bearded devil" was always one to be reckoned with wherever racing cars thundered.

Mackenzie placed third in the 1936 Indianapolis Memorial Day race, sharing honors with Kelly Petillo, who relieved him in the final stages of the race. They drove the Gilmore Special for an average of 107.460 m.p.h.—the same car that Kelly brought home first in 1935.

"Doc" ranked fourth in National A. A. A. competition this year and

was 1935 Eastern dirt track champion.

His campaign for the championship this year was marked with misfortune. Racing at Reading, July 12, he was injured and taken to the Homeopathic Hospital in that city.

During that time, while still abed, he married Miss Verna T. Mather of Langhorne, July 23.

FORD ECONOMY RUN

Operating 24 hours a day for four days over the memorial highway connecting Washington, D. C. and Mount Vernon, Va., a stock Ford V-8 sedan completed an economy run, supervised by the Contest Board of the American Automobile Association, in which a fuel economy record of 22.789 miles per gallon was established, according to information received last month.

The test covered 2764 miles and was conducted at an average driving speed of 29.727 miles per hour, according to the certificate of performance issued by the A. A. A. Contest Board. Oil economy performance was at the rate of 1,387.82 miles per quart, the records showed.

Most important feature of the test was the fact that throughout the drivers, under direction of the A. A. A., were subject to all local traffic and speed regulations including the necessary frequent stops and starts at traf-

fic lights and other intersections. In this way average driving conditions were duplicated. A total of 152 traffic light stops were made.

In the entire four days of operations, which included 92.237 hours running time and 3.763 hours for re-fueling and other servicing, a total of 121.313 gallons of gasoline were used. No water was added during the period of the test and no repairs were required, the certificate stated.

AMATEURS COMPETE IN 75-MILE ROAD RACE

John Marshall, of Boston, driving an Austin car, won the "Millionaire Sportsman's" 75-mile road race through the streets of Alexandria Bay, N. Y., August 17. Thomas Dewart brought his English-made M. G. Midget in second. Robert Heller, driving a Willys 77, was third.

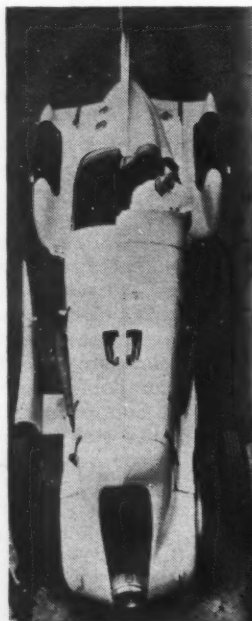
The event was a handicap race, sponsored by the Automobile Racing Assn. of America, and was a part of the centennial celebration in honor of the founding of the village of Alexandria Bay.

The Automobile Racing Association of America is an amateur organization of sportsmen, driving their own cars in speed competition. They compete for prize trophies.

Last year they revived the "Climb to the Clouds" a hill climb up Mount Washington, at Glen House, N. H. The second annual revival was held not long ago. That event was won by Langdon Quimby, of Portland, Me.

NEW VANDERBILT CUP

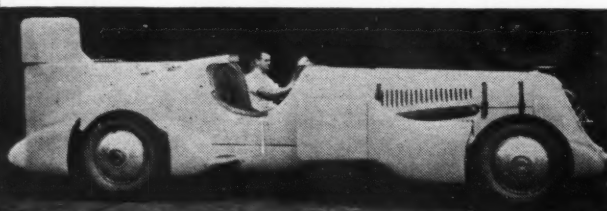
Memories of olden days were awakened with the announcement made by the Roosevelt Raceway management that a new Vanderbilt cup would be awarded at the 400-mile International Race, Oct. 12.



Ab Jenkins' attack on world's speed records, many of which were established by Capt. George Eyston in July, was scheduled to get under way at Bonneville, Utah, as *MOTOR AGE* goes to press.

Jenkins was driving his huge 12-cylinder Curtiss Conqueror engined "Jenkins Special."

In the meantime, John Cobb, fellow countryman of Captain Eyston and Sir Malcolm Campbell had shipped his 500-hp. creation from England with the intention of following Jenkins on his speed record assault over the same Utah salt beds.



History of Diesel Speed Records

(Revised April 30th, 1936)

DIST.	DATE	PLACE	DRIVER	CAR	TIME	M.P.H.
1M (F)	6-13-34	Monthery	G. E. T. Eyston	A. E. C.		120.33
1M (F)	2-15-35	Daytona Beach	Dave Evans	Hemphill-Waukesha Comet		125.065
1M (F)	3- 1-35	Daytona Beach	Bill Cummings	Cummins Diesel	27.05	133.023
5K (F)	3- 1-35	Daytona Beach	Bill Cummings	Cummins Diesel	1:28.075	126.990**
5M (F)	3- 1-35	Daytona Beach	Bill Cummings	Cummins Diesel	2:40.60	112.079**
1K (F)	3- 2-35	Daytona Beach	Bill Cummings	Cummins Diesel	17.36	136.731
1M (F)	3- 2-35	Daytona Beach	Bill Cummings	Cummins Diesel	26.24	137.195
1K (F)	10- 9-35	Brooklands	R. J. Munday	Munday Diesel	23.62	94.70
50K (S)	10- 9-35	Brooklands	R. J. Munday	Munday Diesel	21:09.37	88.11
50M (S)	10- 9-35	Brooklands	R. J. Munday	Munday Diesel	33:55.24	88.44
100K (S)	10- 9-35	Brooklands	R. J. Munday	Munday Diesel	42:10.92	88.38
100M (S)	10- 9-35	Brooklands	R. J. Munday	Munday Diesel	1:08:05.10	88.13
1 Hour (S)	10- 9-35	Brooklands	R. J. Munday	Munday Diesel		88.25
50K (S)	1- 4-36	Monthery	G. E. T. Eyston	A. E. C.	18.53.42	98.681
50M (S)	1- 4-36	Monthery	G. E. T. Eyston	A. E. C.	29:37.81	101.25*
100K (S)	1- 4-36	Monthery	G. E. T. Eyston	A. E. C.	36:36.80	101.83*
100M (S)	1- 4-36	Monthery	G. E. T. Eyston	A. E. C.	58:16.79	102.95*
200K (S)	1- 4-36	Monthery	G. E. T. Eyston	A. E. C.	1:12:14.39	103.22*
200M (S)	1- 4-36	Monthery	G. E. T. Eyston	A. E. C.	1:56:22.04	103.12*
1 Hour (S)	1- 4-36	Monthery	G. E. T. Eyston	A. E. C.		103.01*
50K (S)	2-14-36	Monthery	G. E. T. Eyston	A. E. C.	18:52.61	98.75*
500K (S)	2-14-15-36	Monthery	G. E. T. Eyston	A. E. C.	3:08:37.84	98.82*
500M (S)	2-14-15-36	Monthery	G. E. T. Eyston	A. E. C.	5:05:12.09	98.30*
1000K (S)	2-14-15-36	Monthery	G. E. T. Eyston	A. E. C.	6:20:45.26	97.92*
1000M (S)	2-14-15-36	Monthery	G. E. T. Eyston	A. E. C.	10:12:53.76	97.90*
2000K (S)	2-14-15-36	Monthery	G. E. T. Eyston	A. E. C.	12:43:55.70	97.61*
2000M (S)	2-14-15-36	Monthery	G. E. T. Eyston	A. E. C.	20:44:28.49	96.43*
3000K (S)	2-14-15-36	Monthery	G. E. T. Eyston	A. E. C.	19:18:29.10	96.55*
3 Hours (S)	2-14-15-36	Monthery	G. E. T. Eyston	A. E. C.		98.79*
6 Hours (S)	2-14-15-36	Monthery	G. E. T. Eyston	A. E. C.		98.48*
12 Hours (S)	2-14-15-36	Monthery	G. E. T. Eyston	A. E. C.		98.05*
24 Hours (S)	2-14-15-36	Monthery	G. E. T. Eyston	A. E. C.		94.99*
1M (F)	4-29-36	Bonneville	G. E. T. Eyston	Ricardo	22.66	158.8702*
1K (F)	4-29-36	Bonneville	G. E. T. Eyston	Ricardo	14.06	159.0990*

**—Denotes Existing American Diesel Record
(F)—Denotes Flying Start

*—Denotes Existing World Diesel Record.
(S)—Denotes Standing Start
M—Mile
K—Kilometer.

The famous old trophy, last raced for by the world's automobile speed kings in 1916, has its modern replica today in the George Vanderbilt Cup.

George Vanderbilt, the donor, is a nephew of William K. Vanderbilt, who gave the original trophy, which now rests in the Smithsonian Institute at Washington.

SWANSON TOPS MIDGETS

Bob Swanson, Pacific Coast midget champion, continues to top the point standing for the "World's Midget Auto Racing Championship" being contested at Madison Square Garden Bowl, Long Island City, every Wednesday night.

JENKINS VS. TIME

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Old Timer



GEORGE ROBERTSON at the wheel of his Simplex during trials at the old Fairmount Park road races in 1909. Today, Major George Robertson is general manager of the Roosevelt Raceway, Westbury, L. I.

ASPHALTIC COMPOUND ON ROOSEVELT RACEWAY

The Roosevelt Raceway, now nearing completion, will have a road surface consisting of sand, gravel and oil of asphalt, according to word from Steve Hannagan's office.

The Leaders NATIONAL CHAMPIONSHIP STANDINGS

Driver	Points
Lou Meyer	600
Ted Horn	450
Mauri Rose	400
"Doc" Mackenzie*	364
Chet Miller	300

*Deceased.



Maintenance Woman

By Mrs. Matilda Black
Auto Repairwoman, of San Francisco,
California

IT is now about five years since I put away the sewing basket, donned a pair of coveralls and crawled underneath a car in my husband's garage to do my first repair job. I have been at it ever since, a full-time repairwoman, who has handled practically every kind of job, from straightening dents in fenders to overhauling a sixteen-cylinder engine.

It's great fun being a repairwoman, more fun than going to bridge parties or wasting time at afternoon teas. A woman's place may be in the home, washing dishes

and taking care of the babies. I have had my share of both. My daughters are now grown up and able to take care of themselves, one married, the other in a profession. We put them through college with the earnings from my husband's auto repair shop in San Francisco.

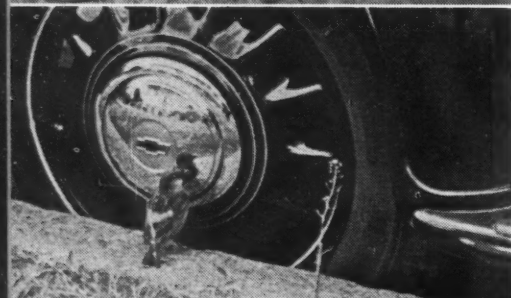
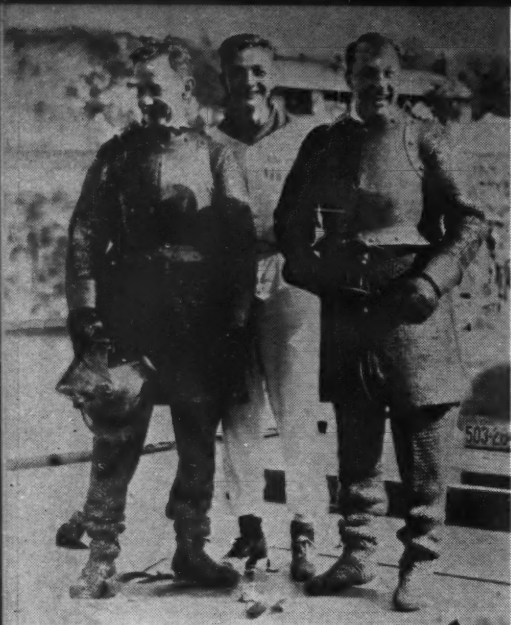
Now I spend eight hours a day in the shop doing a man's work, and I am a real helpmate to Ray. We worked side by side in grimy overalls during the terrible years of the depression, and we pulled through all right. My husband says

that I am a first-class mechanic and he is very proud of it, although when I married him I did not know the difference between a lock washer and a cotter pin.

I guess I must have a natural bent for auto mechanics. I have done practically everything—engine work, transmission, rear end, brake relines, and body work. Yet I find time to keep house for my husband and myself.

My work in the shop is systematized. The first thing in the morning I put the books in order and then tidy up the place, seeing that all tools and equipment are in their accustomed place. I prepare the work sheets and order the necessary parts. When my husband and the other mechanics are busy I can lend a hand to inspect cars before and after work has been done. My husband says I am the best trouble shooter he ever had in the shop. I can usually tell whether the trouble is under the hood, or in the clutch, or in the rear end. I guess it's a knack I have developed in the twenty-five years that I have been helping my husband.

(Continued on page 87)



News of the Industry

Willys-Overland Reorganization Plan Approved; Tax Compromise Reached

Expect to Build 60,000 to 70,000 Cars in 1937 Under
New Reorganization Plan Filed

Down the column:

During the 1935 Soap Box Derby, Paul Brown (center) bowled over announcers Graham McNamee (right) and Tom Manning (left). To broadcast this year's Derby, the "mike" boys came prepared, dressed in suits of armor and chain mail

Miss Mozelle Cravens an employee in the advertising department of AC Spark Plug Co. was selected Miss AC for 1936 during the annual AC outing. Later she was also chosen to represent the city of Flint, Mich. in the Michigan peach festival

At Portland, Ore., an English sparrow battled three hours with its own image in the hub cap of a Chevrolet

This Austin with an oversize spare tire was driven about town to advertise the State Line Garage, Greenwich, Conn.

Waiver of penalties and reduction of tax by 75 per cent on properties not used in the last three years by Willys-Overland resulted in a compromise figure of \$532,749 to settle the Lucas county tax claim and remove the last obstacle to organization of the new Willys-Overland Motors, Inc.

The reorganization was approved by Federal Judge George P. Hahn at Toledo, Aug. 28. The plan was advanced by Empire Securities, Inc.

David R. Wilson, trustee and president of the old company, testified before the court that the manufacturing program calls for 60,000 to 70,000 cars for 1937. When asked if he considered that a conservative production plan from the standpoint of sales, he said he had sold 47,000 already "from a picture."

He described the new car as larger, but built around the same powerplant. It will be a five-passenger model with smart appearance. The first cars are scheduled for Nov. 5.

I. G. & M. A. Plans To Be Discussed At Trade Conference In Chicago, Sept. 21-23

Sponsored by the International Garage & Maintenance Assn., independent service garages and maintenance operators will hold a convention at the Morrison Hotel, Chicago, Sept. 21-23.

The furtherance of the I. G. & M. A. platform and the development of its organization will be the major points under discussion.

The platform contains ten points which state the objectives of the organization: To condemn and discourage the use of unreliable supplies and merchandise; to encourage cooperation between operators, wholesalers and manufacturers; to distribute unbiased information regarding profitable service and merchandising methods; to proceed with the "nation-wide identification of competent mechanics"; to protect operators against unfair license and tax legislation; to advise members on local procedure for promotion of official safety inspection laws and ordinances; and other constructive measures.

The plan of organization is to set up a network of local associations with the national organization at the head. Thirteen zones have been established. State councils or committees are composed of six members from each state. Zone councils are made up of members from state councils in that zone.

Charles B. Berg, Kansas City, Mo., is president. Vice-presidents are Frank

Domina, Providence, R. I.; Austin Gailey, New York City; Al C. Gordon, Cleveland, Ohio; L. G. Wilcox, Minneapolis, Minn.; Phil Crutcher, Louisville, Ky.; Manley Harris, San Francisco; W. P. Enzweiler, Chicago, is secretary; Herman Koppelman, Chicago, is treasurer; Don Herr, Indianapolis, Ind., is chairman of the board; and E. T. Sadler, Chicago, is executive secretary.

Keneipp and Toboldt Address Phila. Meeting

A big turnout of independent servicemen heard George Keneipp, well known in the maintenance industry and now with Keystone Automobile Club at Washington, and Bill Toboldt, editor of MOTOR AGE, speak on timely maintenance topics Aug. 27. The gathering, sponsored by Central Motor Parts Co. of Philadelphia, numbered nearly 400 maintenance men from Philadelphia and vicinity. Samuel Haisfield, president of Central Motor Parts, and William Baron, sales manager of the company, were hosts.

Leon F. Banigan, merchandising director of Edison-Splitdorf Corp., West Orange, N. J., conducted the meeting as master of ceremonies and introduced the chief speakers, George Keneipp and Bill Toboldt. One hundred and fifty door prizes were awarded.

Labor Day Pikes Peak Climb Revived

After a year's layoff, racing cars and stock automobiles will resume their annual climb up historic Pikes Peak on Labor Day, Sept. 7. Sanction for the event has been issued by the contest board of the American Automobile Association to the Veterans of Foreign Wars of Colorado Springs, Colo.

Three divisions will comprise the Seventeenth Pikes Peak Climb similar to programs presented annually until last year. In 1935 the event was not organized because of the question as to who would hold the lease on the road. There will be an event for racing automobiles, one for stock cars costing less than \$1,000 and a third for stock cars costing more than \$1,000 at the factory.

Each entrant will be sent away from the starting tape at the foot of the 12-mile mountain highway on a flying start gained over 300 yards. The car will be timed and the driver showing the fastest time for the 12 miles and 2,200 ft. will be awarded first in his division.

In 1934, the last year the climb was held, Louis Unser placed first in the racing division when he negotiated the distance in a Shultz Special in 16 minutes, 1.8 seconds. Phil Shafer, of Indianapolis fame, was second in his Shafer "8" Special at 17 minutes, 23.1 seconds, and Walt Killinger drove his Sweeney Special to third place with 17 minutes, 26 seconds. The stock car event attracted only Ford V-8's. B. D. Hammond's Ford roadster finished in the best time, 19 minutes, 25.7 seconds; Angelo Cimino was second in 19 minutes, 28.7 seconds and Glen Shultz was third in 19 minutes, 39.1 seconds.

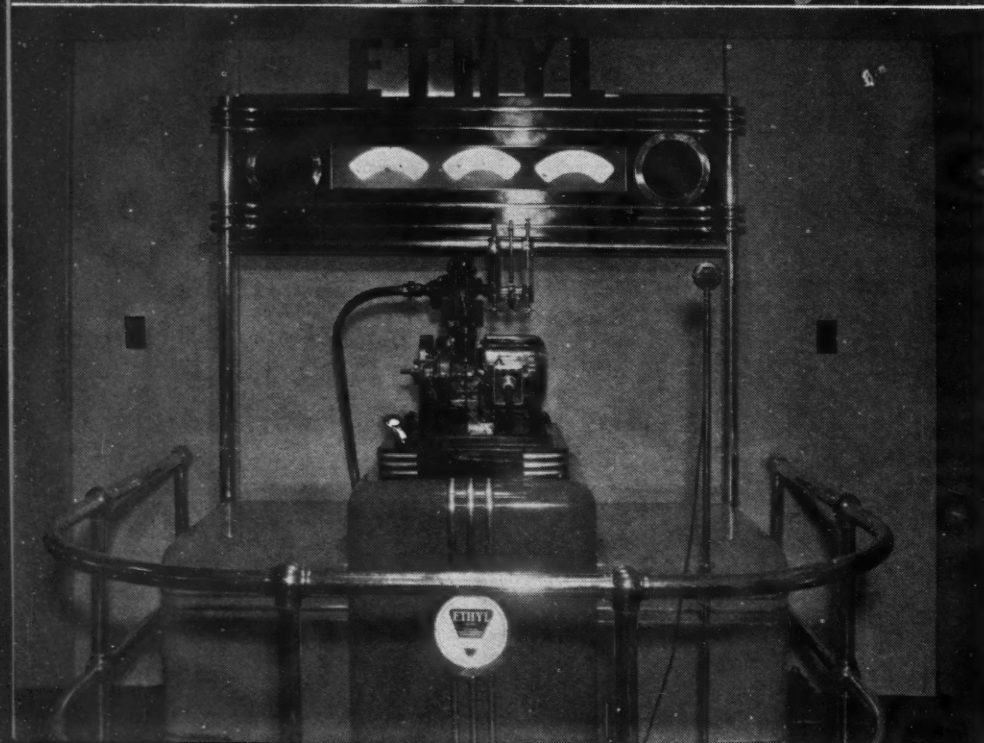
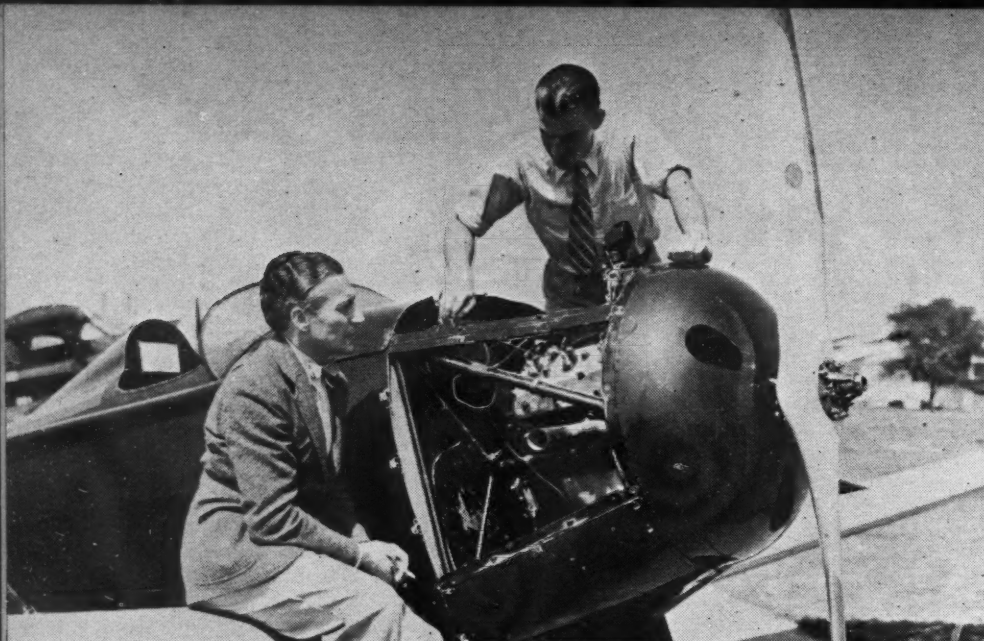
With the passing of Glen Shultz, who did not compete in the racing car division in 1934, it will be the task to find a new "champion" of the Peak. Shultz, a native of Colorado Springs, won the racing event in 1932 and 1933 and was conceded master of the 50 hair-pin turns on the treacherous road that rises approximately 5000 ft. Although confining his driving to the stock car division in 1934, Shultz won a "moral victory" in the racing division for the first-place car was a Shultz Special. He died in 1935.

Down the column:

Kaye Don, English racing driver, who recently won the 33rd annual gold cup regatta at Lake George, is shown witnessing his first base ball game. Explaining the game to him are F. A. Berend, advertising manager of Pontiac Motor Co. (right), and William S. McLean, advertising manager of Fisher Body Corp. (left)

These photos show general views of the General Motors and Ford plants at Barcelona, Spain, which, according to reports, were seized by warring factions in the Spanish civil war





ASI Space Drawing Sept. 11

Applications now on hand for every bit of available display space in the 1936 Automotive Service Industries Show make it appear that the show operating committee may have to set a limit on the amount of space allotted to any one concern, in order that all qualified applicants for space can be accommodated. According to a report from the Chicago office of A. B. Coffman, show manager, 288 concerns had filed their space applications by midnight, Aug. 10, the deadline for receipt of applications to be included in the first space drawing.

At the show space drawings to be held in the Hotel Sherman in Chicago on Sept. 11, manufacturers whose applications were on file by Aug. 10 will receive first consideration, while new members and those filing after that date will participate in the second drawing. The drawings will be under the supervision of the Joint Operating Committee, representing the three sponsoring associations, the National Standard Parts Association, Motor & Equipment Wholesalers Association, and Motor & Equipment Manufacturers Association.

Tests Show Dirty Plugs Lose Two Miles Per Gallon

Tests that have been made under supervision of the University of Michigan engineering department as to the mileage from cars in the low priced class when run with worn or dirty spark plugs, or with clean new plugs, shows that more than one gallon of gas in every ten used is wasted when the plugs are dirty.

The average mileage from cars equipped with clean plugs was 18.68 miles per gallon, as against 16.75 miles per gallon when the plugs were dirty and badly worn.

Down the column:

Eugene Vidal (on wing of plane), chief of the Bureau of Air Commerce inspecting a new model light airplane, the power plant of which is a Ford V-8 engine remodeled for aviation use by installing a reduction gear to reduce propeller speed from 3,000 r.p.m. to 1,500 r.p.m. and other minor changes

AC Spark Plug's winning float in the Flint, Mich., Jubilee of Progress parade. AC Spark Plug Co. was born in Flint 28 years ago

This is the Ethyl Gasoline exhibit in the General Motors Building at the Texas Centennial Exposition. The demonstrating engine, finished in chromium, is mounted on a blue and chromium cabinet.

"HATS OFF"

says America "to Pontiac and Pontiac Dealers"

WE present herewith a few more examples of the unprecedented loyalty and enthusiasm which Pontiac cars and Pontiac dealers inspire in Pontiac owners. These brief quotations, representative of the thousands upon thousands of letters that pour in to Pontiac, speak for themselves. Obviously, Pontiac cars and Pontiac dealers enjoy confidence and prestige seldom given to any product or any organization. And make no mistake about it, these letters are the authentic voice of America as a whole, for they come from people in every income group and in every type of occupation. Select a hundred of these letters at random, check up on the writers and you would have

before you an exact cross-section of the average American community.

The practical aspect of this fact will be readily recognized. Thanks to Pontiac's fine quality and the high calibre of Pontiac dealers, this car has won consideration and acceptance from every kind of buyer, regardless of the price-class in which he habitually buys! *Pontiac's sales possibilities are virtually unlimited.* As a result, established Pontiac dealers have no fear of saturating the market in their particular communities. And the future and profits of new Pontiac dealers are restricted only by their ambition and capabilities.

PONTIAC MOTOR COMPANY, PONTIAC, MICHIGAN

"Before buying a new car I talked to Pontiac owners and that's what sold me a Pontiac. They couldn't say enough about this fine car and the equally fine dealer service."

L.T.W., San Francisco, Calif.*

"The perfect car for the traveling man, especially because I find the same kind of conscientious dealer and able service men everywhere I go."

P.R.T., Ada, Okla.*

"Pontiac has everything any human needs for comfortable, effortless transportation. Your dealer has given me attention far beyond my actual needs and expectations."

F.M., Houston, Pa.*

"The outstanding car in the low-price field for service, comfort, beauty and economy. Your dealer is recognized as the most dependable and courteous in the state."

W.L.S., Oshkosh, Wisc.*

"I have never dealt with a company that gives such service as your dealer here. I hope to buy another Pontiac next year, and you can bet I wouldn't buy it anywhere else."

C.B.R., Saginaw, Mich.*

"As a result of the fair dealing of your dealer here and my complete satisfaction with my new Pontiac, the truck I intend to buy soon will certainly be built by General Motors."

R.S., Dallas, Texas*

"I have done business with your dealer for more than three years. During that time they have rendered me more than satisfactory service, and this is in keeping with their general reputation for honest, efficient, reliable service."

A.E.S., Auburn, N. Y.*

"We have purchased 15 Pontiacs from your dealer here so you can imagine that we are well pleased with both your car and your dealer."

A.M.S., Bridgewater, Mass.*

*Excerpt from a letter on file at the Pontiac Motor Company.

If you are interested in acquiring the Pontiac franchise, please communicate with C. P. Simpson, Vice-President and General Sales Manager, Pontiac Motor Company. Your communication will be regarded as strictly confidential.

Pontiac
DIVISION OF GENERAL MOTORS



Increased Load on Battery Creates Need For Bigger Generators, Stambaugh Says

The demand for electrical equipment has grown to such a tremendous extent that a big generator is required to meet the needs of the modern car. Thomas H. Stambaugh, general service manager of the Hudson Motor Car Company, recently computed that if all the electrical equipment on one of the big custom Hudson eights happened to be turned on at the same time, it would be equivalent to an amperage draw of 95.29 amperes, or expressed in watts, would be the equivalent of a 571.74-watt lighting plant.

"It is no wonder we have had to put larger and larger generators capable of producing more and more current on cars," states Stambaugh. "Not very long ago a generator which would charge at the rate of 10 amperes was considered satisfactory. Today our generators have a normal output of 16 to 24 amperes, and for the winter are often adjusted for an even higher output than that.

"If we drive a car with the two headlights turned on, with the radio going and, naturally the tail light lit, we are using 18.1 amperes. At this rate the output from the generator just about balances with the current draw. Every time we blow the horn, however, we take 27 amperes, if we happen to have the twin air horns with which these cars are equipped. Using the radio takes 7.6 amperes. When we put on the brakes, the two stop lights light up at a cost of 6 amperes. When we use the cigar lighter we draw 13 additional amperes, and so on down the line.

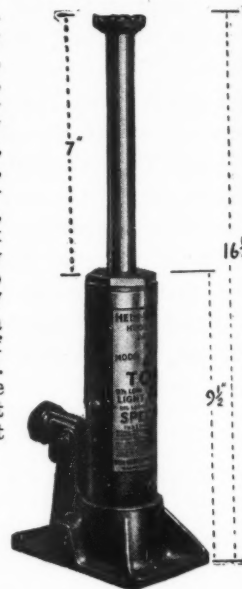
"The average owner does not realize the load on the electrical system of an up-to-date car. Of course we do more daylight driving, normally, than night driving. This gives the generator a chance to bring the battery back to normal after the severe drain due to headlights and other equipment used at night. Voltage regulation as used on Hudsons and Terraplanes prevents over-charge in the event the owner does not use all of this equipment.

"Driving during a winter night puts the greatest load on a battery. At that time, in addition to the equipment mentioned above, we may use a defroster which takes 9.8 amperes, or we may have one of the amber fog lights used at the front end of many cars. These draw 6.15 amperes. The heater takes 2.75 amperes. If we use a spotlight, it costs us 6.6 amperes, etc.

"The moral of the story, of course, is to keep the battery in good condition and have the generator checked from time to time so that it is giving maximum and efficient service. The modern air-cooled, heavy duty over-size generator and storage battery as used on Hudsons and Terraplanes are rugged instruments. They are capable of taking care of the needs of the modern motorist when given normal care and attention. During the hot summer weather have the battery checked every week. During the winter, every three weeks or, if you drive more than the normal mileage, at more frequent intervals than those specified. The generator should be checked over after every 7500 to 10,000 miles of service."

New Hydraulic Jack For Light Trucks

The Hein-Werner Motor Parts Corp., Waukesha, Wis., has announced a new hydraulic jack, Model 2.95A, with a capacity of 2 tons, for light truck use. The new jack is said to have a lift of 7 inches, with a total height of 16½ inches. List Price \$5.95; West Coast List \$6.45.



Midget Sanction Withdrawn

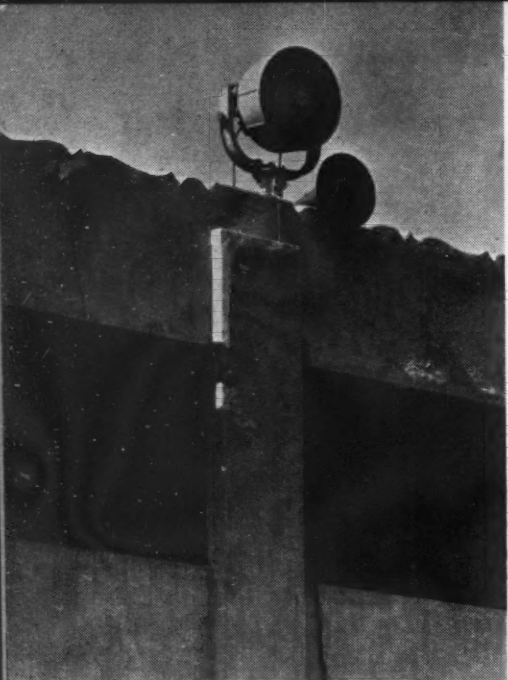
Because promises of creating a sectional circuit among mid-western midget racing tracks weren't fulfilled, the contest board of the A.A.A. has withdrawn its sanction of midget auto racing at Riverview Speedway in Chicago. However, midget racing at Riverview continues.

Down the column:

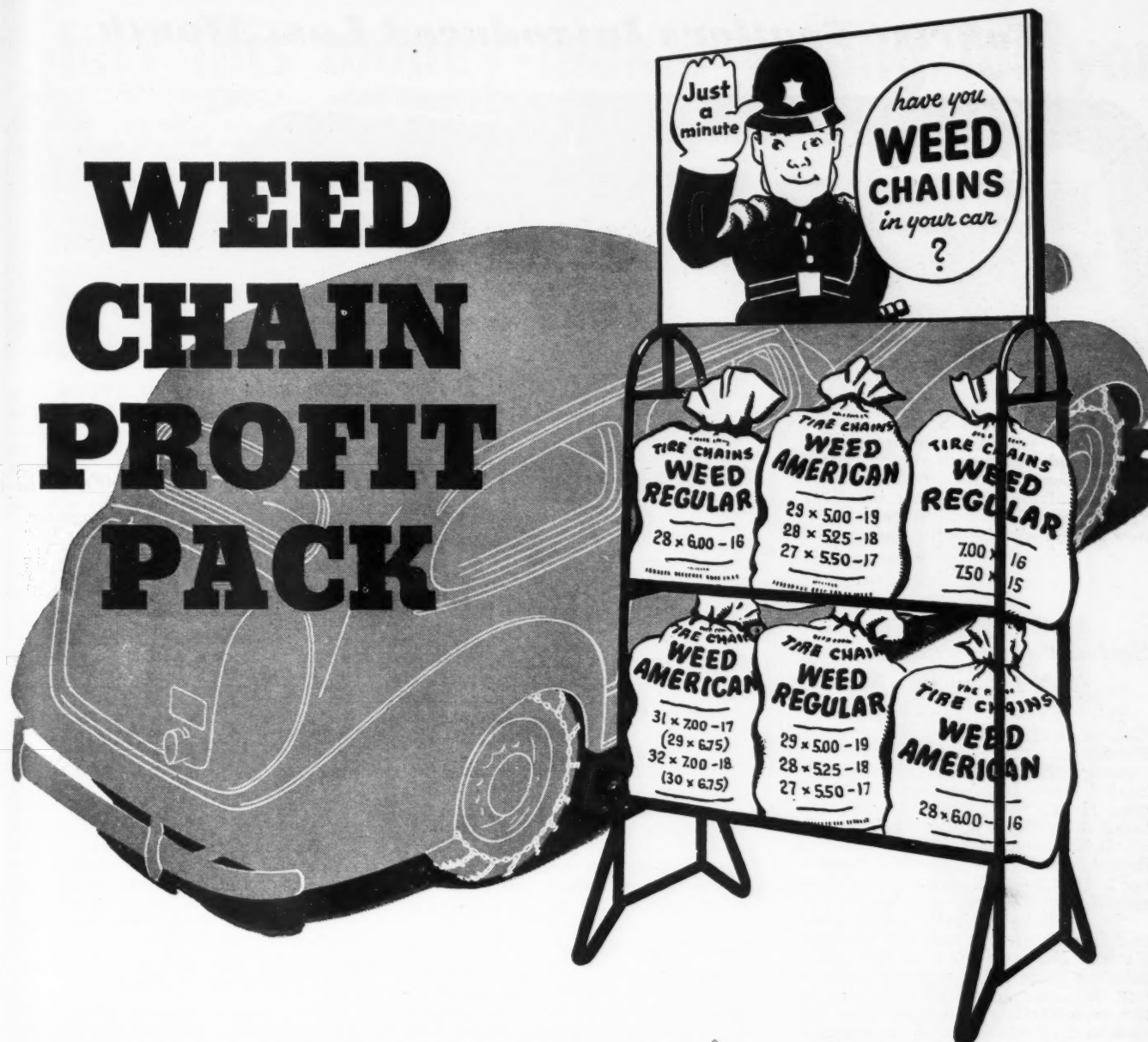
A powerful sound projecting system is being installed at Roosevelt Raceway, Westbury, L. I. Top photo is a view looking up at a super-power loudspeaker mounted atop a hangar at Roosevelt Airport during preliminary tests and demonstration

Hamford H. Marshall receiving the trophy symbolic of the national motorcycle championship after winning a 200-mile motorcycle road race at Swanzey, N. H., recently

The little church around the corner in Waterbury, Conn., is now a garage and service station



WEED CHAIN PROFIT PACK



GET IN ON THIS SPECIAL PLAN ...

● **FREE**—a Cop Display Stand like picture—the best sales maker in the accessory field—to dealers who order a Profit Pack for delivery not later than October 1.

"Profit Pack" is a live assortment of Weed tire chains, cross chains and units to fit the most popular makes of cars. Not a lame duck in the lot. Tested in limited territory last year, sold so much merchandise for dealers we now offer it to all Weed dealers. Small investment, liberal margin.

Ask your jobber for particulars. Don't miss this chance. Biggest National advertising campaign in years coming on Weed American Bar-Reinforced Tire Chains.



AMERICAN CHAIN COMPANY, Inc.
BRIDGEPORT, CONNECTICUT
"In Business for Your Safety"

Licensed to manufacture and sell Bar-Reinforced Tire Chains under United States and Canadian Letters Patent: American Chain Company, Inc.; The McKay Company; The Hodell Chain Company; Pyrene Manufacturing Company; Dominion Chain Company, Limited; and Pyrene Manufacturing Company of Canada, Limited.

MAIL THIS TO YOUR JOBBER

Please send me—
folder describing Weed
Chain Profit Pack and Free
Cop Display Stand.

Your Name

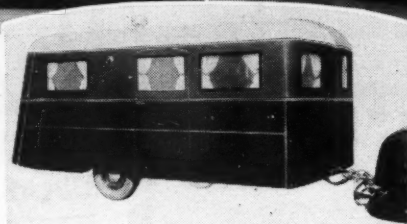
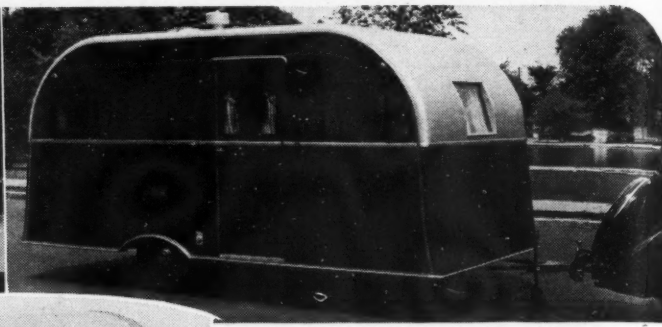
Address

City.....State.....

Tourist Trailers Introduced Last Month



PIERCE ARROW'S new Travelodge (above), tourist-trailer announced last month. Pierce-Arrow Motor Corp. is the first passenger car manufacturer to enter the field "Safety Steel" tourist trailer (right) now being built by Hayes Body Corp.



FEDERAL MOTOR TRUCK CO., in addition to manufacturing its line of motor trucks, is now engaged in producing trailers which are known as "Motorhome" for living purposes and "Motormart" for commercial use. (Above) is the standard model of the Federal Motorhome

Sealed Power Acquires

B-N Piston Pin Jobbing

The Burgess-Norton Mfg. Co., Geneva, Ill., through C. M. Burgess, President, announced on July 31, the signing of an agreement with the Sealed Power Corporation of Muskegon, Mich., whereby the latter firm takes over the inventory and sale of all B-N replacement piston pins on September 1, and effective September 1, 1936, will fill all orders for Burgess-Norton jobbers.

"It should be distinctly understood," said Mr. Burgess, "that the Burgess-Norton Mfg. Co. are merely withdrawing from supplying the jobbers, and will concentrate all activities on the manufacture of piston pins for standard equipment and on contract for other manufacturers. Our volume

of business in this connection has increased to such an extent, that we have extended our original 1935 new equipment program involving expenditure of \$50,000.00, to add a still additional number of high-speed production machines."

The B-N Piston pin line was first introduced to automotive wholesalers in 1919, and has been one of the leading lines on the jobbers' shelves ever since.

Burgess-Norton ranks today as one of the largest piston pin producers in the country.

Ray Pixley Killed

Ray Pixley of Los Angeles, who finished sixth at the 500-mile Indianapolis race, Memorial Day, was killed at the Municipal Stadium, Roby, Ind., Aug. 30.

American Brakeblok Offers

New Roll Lining Dispenser

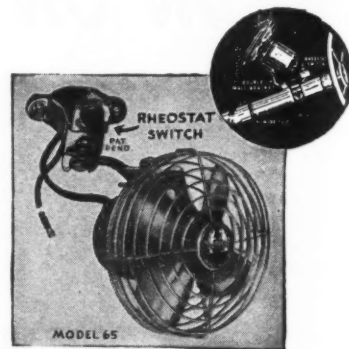
In conjunction with four popular size rolls of American Brakeblok, this new roll dispenser is now being introduced to the trade in a special combination offer by the American Brakeblok Corp., Detroit, Mich. It is said to permit each roll to be easily pulled out, measured and cut to the desired length in a few seconds time. A cutting tool is fastened by a chain to the dispenser, and a spring steel tape measure built into the dispenser can be drawn out flush with the lining surface for measuring.

New Features In Fans

G. A. Ashton, Inc., St. Paul, Minn., has announced several new features that have been incorporated in their



"I don't see why they have a weather bureau anyway"



1936-1937 line of Gopher and companion defrosting and ventilating fans. The standardizing of all swivel ball and bracket measurements to give more flexibility in the use of the fans, a new sales plan, and the introduction of an entirely new smaller model known as Little Wonder, are some of these features. The present line of electric fans now consists of eight styles, ranging from the Little Wonder Model No. 20, 3½-in. size, up to the Gopher Heavy Duty Model 95, 6-in. size, for motor coaches and trucks.

Start this money-maker selling for you



In less than 30 days, a multitude of dealers have put the Exide Automatic Vendor to work making battery sales automatically!

- ★ It displays side by side the batteries that fit a particular car.
- ★ Shows the original equipment size.
- ★ Prices the batteries.
- ★ Describes the service for which each battery is built, enabling the customer to make a sensible choice.

★ Compares them on the basis of cranking ability, life and price.

★ Shows by direct comparison the greater values in the better grades of Exide.

FREE! For a limited time only

For a limited time, Exide Automatic Vendors will be given free with the purchase, at new low prices, of the batteries they display. One Vendor features batteries for Chevrolets, Plymouths and others—the second covers Fords, Terraplanes and additional makes. These two Vendors cover 86% of the car market.

See your Exide Wholesaler or get in touch with us today

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

Exide AUTOMATIC VENDOR



SCOTLAND YARD welcomed tests of Sir Malcolm Campbell's "claw." This device invented by the driver of the fastest automobile is a device extending five feet eight inches from the front of the car. Operated from inside the car it can be moved in any desired direction and grabs the spare wheel or bumper of another car.



Merchandising Organization Completed for Auto Lite Plugs



F. A. Nealon

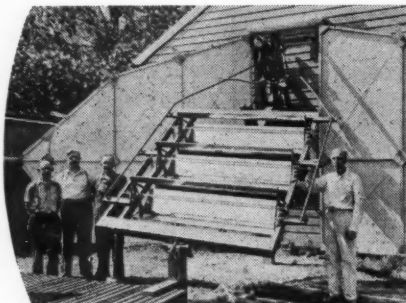
Frank A. Nealon, sales manager of the new merchandising division of The Electric Auto Lite Company, Toledo, announced completion of a worldwide marketing organization for Auto Lite's latest product, spark plugs.

Mr. Nealon has appointed six divisional managers for the United States. They are Joseph F. Clark, New York City, Eastern division; Herbert A. Roberts, Cleveland, Mid-western division; H. C. Williams, Chicago, Central division; Edward F. Arnold, Oklahoma City, Southwest division, and D. M. Skirving, San Francisco, Western division. Each selects his own district managers.

Mr. Nealon also announced the appointment of R. C. Thompson as export manager, with headquarters in New York City. Auto Lite has 57 distribution points in foreign countries, two in Canada, and several thousand retail outlets in the United States, including 2000 of its own official service stations.

Formerly sales manager of the Sterling Cable Corporation and the American Enameled Magnet Wire Company, Port Huron, Mich., both now Auto Lite subsidiaries, Mr. Nealon is widely known in automotive circles of this country. Some years ago he was a sales executive of the Packard Electric Company and prior to that was in the advertising agency business.

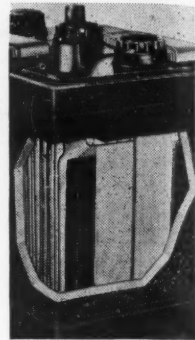
Under his guidance the new merchandising division will distribute, in addition to Auto Lite spark plugs, Moto Meter accessory products and various other automotive items.



DELEGATES to the Third World Power Conference will see the first demonstration of a small steam engine driven entirely by heat from the rays of the sun.

Kathanode Announces Life-Time Battery

An entirely new principle in battery construction has enabled the Kathanode Corporation, Chicago, Ill., to produce an automobile battery which they guarantee "as long as the purchaser owns his car." The heart of a storage battery is its active material—the lead particles



in the plate upon which the electrolyte acts. As these particles drop away during normal wear and vibration, the life of the battery is shortened. The new principle developed by the Kathanode Corp. consists of two flexible and highly porous retaining mats made of many layers of finely spun glass which are placed against both surfaces of the positive plate. These laminated glass mats hold the particles to the plate, while at the same time their porosity permits a free supply of acid to the entire surface of the plate and in no way restricts the passage of the current. This construction permits changes in container design so that larger cells, and wider and higher plates can be used without increasing the outer dimensions.

Bee-Line Opens New Wheel Alignment School In Chicago

A school for the development of maintenance men interested in wheel alignment, has been opened in Chicago, by the Bee-Line Manufacturing Co., of Davenport, Ia.

The school is completely equipped with modern Bee-Line Service equipment and the student will have the opportunity to become acquainted with every phase of checking and correcting misalignment of wheels and other kindred subjects, such as frame and axle straightening.

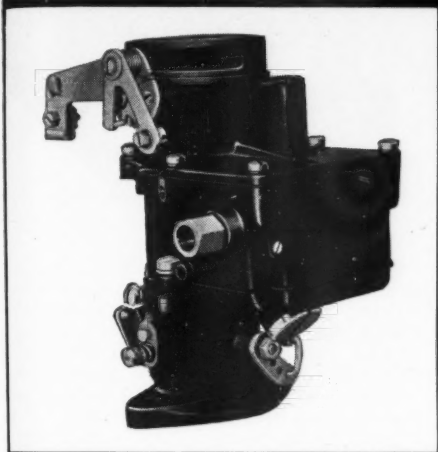
Frank Haasl of Bee-Line Frame & Axle Service, 3160 Halsted St., Chicago, is in charge of the new Alignment School and will welcome inquiries from maintenance men.



WILLIAM TERPSTRA, JR., with his father's home-made pumping outfit—an old car sunken into the banks of a stream—which pumps water and increases farm crops.

BENDIX

EXCHANGE-PLAN MERCHANDISING



BENDIX-STROMBERG

Factory-Rebuilt Exchange Carburetors

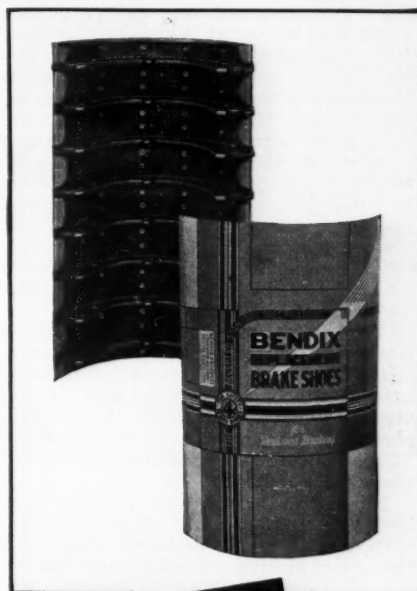
Servicing, renewing, the world's foremost carburetor, and installing it in place of older equipment, is a real business. It is growing constantly more profitable, as Stromberg Carburetors go into service at the rate of more than a million and a quarter a year!

Bendix has vastly simplified carburetor service work for you—made full price, full profit and full customer satisfaction *automatic*, through the Stromberg Factory-Rebuilt Exchange Carburetor. Get the details.

RESTORED BRAKING

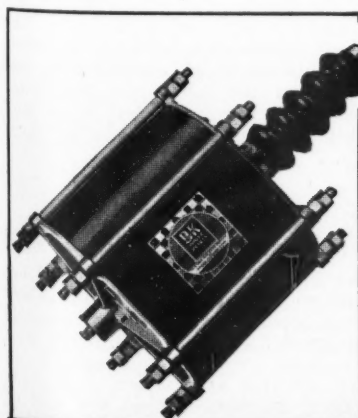
Bendix Genuine Replacement Brake Shoes

Bendix Restored Braking means positive, proper brake renewal. You remove the old shoes and install new ones, factory-fitted with the correct type of lining. The lined shoes are precision-ground to exact concentricity with master drums. Tedious adjustment and later take-up are eliminated. Shoes packed in sets, ready to install. Bendix Brake Lining Segments are also packed in sets for specific cars. Write for prices and full data.



BENDIX B-K *Factory-Rebuilt*

Power Braking Kits



Save time and money. Avoid lengthy tie-up of owner's truck or car—assure perfect renewal—fully guaranteed factory-rebuilt units. Expertly assembled, thoroughly tested and refinished.

More than 96 per cent of all Power Brake installations are Bendix. When you put up your sign of Bendix B-K Service you're "Power Brake Headquarters" automatically. Installation is simple, service and maintenance are easy, profits are good. What finer set-up could any franchise offer?

**BENDIX
IS PLEDGED TO
SAFETY**

BENDIX PRODUCTS CORPORATION
(Subsidiary of Bendix Aviation Corporation)
401 Bendix Drive, Dept. 11, South Bend, Indiana
Send me full details regarding Bendix Exchange-Plan Merchandising.
☐ Stromberg Factory-Rebuilt Exchange Carburetor.
☐ Bendix B-K Factory-Rebuilt Power Braking Kits.
☐ Restored Braking—Bendix Genuine Replacement Brake Shoes.

Name.....
Address.....
City.....State.....
Nature of Business.....

A NATION-WIDE SERVICE THAT PROFITS THE OWNER, THE SHOP, THE JOBBER



M. E. COYLE, president of Chevrolet Motor Co., awards the All-American Soap Box Derby trophy and a \$2,000 college Scholarship to Herbert Muench, age 14, of St. Louis, who won the Derby at Akron last month. At the right is C. P. Fiskin, Chevrolet's advertising manager.

116 Boys In Chevrolet's Soap Box Derby

One hundred thousand persons saw 116 juvenile racers from as many American cities, vie for honors in the third running of the All-American Soap Box Derby at Akron, Ohio, Aug. 16. Sponsored by the Chevrolet Motor Co. in cooperation with leading newspapers the soap box derby graduated from the category of an All-American amateur juvenile racing event into the class of an international event when Herbert Muench, 14-year-old son of a St. Louis X-ray specialist and winner of the All-American championship, raced Norman Neumann of Pretoria, South Africa, for the world's championship, which he won easily.

The scene at Akron resembled a miniature Indianapolis speedway race, with service pits and pit attendants to attend the tiny racers, and Harry Hartz and "Wild Bill" Cummings cheering the contestants and Captain Eddie Rickenbacker acting as one of the race officials.

For his All-American victory Herbert received a \$2,000 college scholarship, a gold medal set with diamonds, the All-American trophy and the In-

dianapolis speedway trophy for the fastest car. Harold Hanson of White Plains, N. Y., who finished second, won a Chevrolet Master two-door sedan and a medal set with rubies. Robert Richards of Lima, Ohio, in third place, won a Chevrolet Standard sedan and a medal set with sapphires. Other prizes included moving picture cameras, and wrist watches for the 116 city champions. Muench and Hanson both received international trophies, both having crossed the line ahead of the South African champion.

M. E. Coyle, president, and C. P. Fiskin, advertising manager, of the Chevrolet Motor Co., awarded the prizes at a banquet following the races. This year for the first time all professionally built racers were barred. Each contestant certified he had built his own racer and had not spent more than \$10 for parts.

The races were broadcast by Graham McNamee over an NBC nationwide network, and by short wave to Europe and the South African home of Norman Neumann.

Synthane Noisometer Compares Gear Noises

In order to make visible the difference in gear noises made by Synthane laminated bakelite gears and metal gears, the Synthane Corporation of Oaks, Penna., manufacturers of laminated bakelite sheets, rods, tubes and gear materials, developed a device called the Synthane "noisometer," which was exhibited for the first time at the Machine Tool Show.

The "Noisometer" consists essentially of two parts, a cathode ray oscillograph and a train of spur gears. The gear train is so arranged that through a gear shift lever either a Synthane laminated bakelite gear or a steel gear can be thrown in mesh in the intermediate position. Driver and driven gears are steel. The Synthane and steel intermediate gears were cut at the same setting and keyed to the intermediate shaft.

In the illustration, the Synthane

gear is shown in mesh. By pulling the shift lever forward the steel gear can be cut in while running. Thus,



a comparison of the noises can be quickly made by ear. A more accurate, graphic comparison can, however, be made by eye at the same time. You will notice on the panel in back of the gears a microphone. Noises generated by the gears are picked up by the transmitter and relayed to the cathode ray oscillograph mounted on top of the display.

Noises are reproduced as a pale green line on the screen of the cathode ray tube, the height of the wave, or amplitude, representing the volume of noise.

The two curves below show relatively the noises made by the gear train with Synthane and steel intermediate gears. The "Noisometer" demonstration proved so interesting to Machine Tool Show visitors that it has been set up in the plant at Oaks, Penna., as a permanent exhibit.

Exide "Automatic" Vendor

The Electric Storage Battery Co., Phila., Pa., has introduced a new battery display stand, called the Exide "Automatic" Vendor. It displays an Exide of the size used as standard equipment for the particular car listed on the Vendor, an Exide of the same size but lower in price, and another Exide of the same size but higher in price. Comparison tables on the Vendor show the difference in percentages between the S. E. A. standard of cranking ability, life, and the price of each type. The original equipment battery is taken as the standard of comparison, and is rated as 100 per cent; the lower priced battery being rated below and the higher priced battery being rated above.

Illinois Automotive Ass'n Show Set for April 24-28

The Illinois Automotive Association announces that its fourth annual show and maintenance exhibits will be held from April 24-28, 1937, at Navy Pier in Chicago. Abe Cole, executive secretary of the association and show manager, announces that the size of next year's event will not be materially increased. He reveals, however, that more than 90 per cent of the available space has been reserved.



TO dramatize the load that motorists must carry, the Automobile Club of Phila. sent to every member of the Penna. State Legislature a miniature automobile to which were attached five pennies, representing tax on one gallon of gasoline.



This man is a great kicker—
but not on the football field.
Learn below how to handle him

BLOCKING kicks is a good idea on the football field . . . but an even better one in your showroom.

For a discontented new owner can knock more potential sales on the head than your star salesman can work up in a month!

So it's worth going out of your way to try to make *every* owner a spreader of glad tidings about your car. Good as that new car is, you should prime it for an *extra swell send-off*. This is simple to do, as many dealers will tell you. It means taking these two steps . . .

Number one—fill the crankcase of that brand new car with Gulfpride. This is without question the finest motor oil in the world! It will do more to prevent little mechanical troubles than any other motor oil known. Refined by Gulf's exclusive Alchlor process, this 100% Pure Pennsylvania Oil is scrubbed so clean of trouble-making compounds that it has actually lubricated motors for 80,000 miles without any need for removing carbon. There's a record to shoot for!

Number two—load the tank with Gulf No-Nox Ethyl Aviation Grade Gasoline. This puts spurs in a fleet car's flanks . . . squeezes out every last ounce of speed, pick-up and power that lies beneath that sleek hood. It sends a car out ready to do better than its best—gives it a punch you can't get with other gasolines!

Do these two things and you'll find

that instead of a grouch you've got an owner who's singing hosannahs—and acting as your non-commissioned salesman among all his friends.

Get the complete story . . . fill out coupon below and mail it today. It will bring you a FREE copy of Gulf's interesting new book, "You Can't Call It Luck." It's a book with a *profit* story.

GULF PETROLEUM PRODUCTS

FIND OUT WHY
THE GULF SIGN
IS THE
DOLLAR SIGN



GULF,
3800 Gulf Bldg.,
Pittsburgh, Pa.

Please send me my FREE copy of
that book "You Can't Call It Luck."

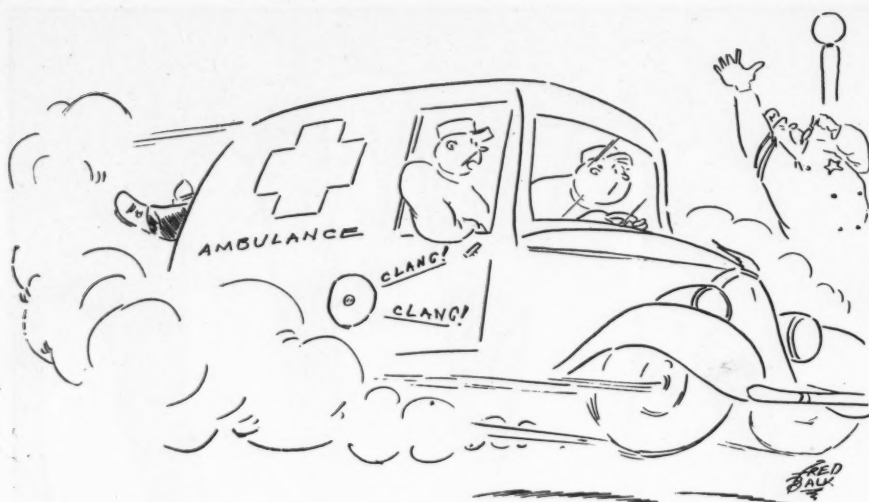


MA-96

Name _____

Street _____

City _____ State _____



"Was it an auto accident or was his wife following him?"

Repairman's Visit To The F A C T O R I E S

The rumor, apparently started by a New York columnist, to the effect that a Chicago mail order house would soon market a car to "sell at \$345 and do 40 mi. per gal." was officially denied by F. M. Folsom, vice-president in charge of merchandising of Montgomery, Ward and Co., Chicago.

C. G. McQuaide, vice-president and general sales manager of Publicker, Inc., producers of Super Thermo and Thermo Royal Anti-Freeze, has announced the following additions to his executive and field personnel: Paul Francois, the company's chief engineer, has been named sales manager of the Anti-Freeze Division. He will continue as chief engineer. H. B. Malloy is national account executive. Lloyd Z. Pack is regional sales manager, headquarters in Kansas City. Western manager is J. D. Small, headquarters in Chicago. B. E. Loring is the newly appointed regional sales manager operating out of Boston. Ben Nelson is eastern manager, with headquarters in New York City.

AC Spark Plug is expanding its plant facilities with the addition of a new building containing 50,000 sq. ft. of floor space. The new building will be completed this month, according to Fred S. Kimmerling, AC president and general manager. Mr. Kimmerling recently pointed out that production and sale of spark plugs for replacement use during the past eight months have been highest in AC's 28 years' history.

The new addition to the Ramco plant in St. Louis, increasing plant capacity 25 to 30 per cent, is completed and was officially opened by J. A. Ramsey, president of the Ramsey Accessories Mfg. Corp.

Leo Hunderup, general sales manager of the Van Norman Machine

Tool Co., has announced the appointment of C. E. Holmes as sales promotion manager.

Another recent Van Norman announcement was the purchase by that company of the brake-drum lathe and brake-shoe grinder business of the L. W. Aff Machine Works, San Francisco. All inventory has been transferred to Springfield, Mass., where production has been started. The full Aff line of brake and brake-shoe equipment will now be made, sold and guaranteed by Van Norman, as an addition to its present line. Purchase did not include the Aff plant, which continues as a general machine shop.

Additional plant equipment has been installed in the Manley Products Corp. plant at York, Pa., to increase production on Remco valves.

A two-story addition to the engineering building, providing an increase of 13,200 sq. ft. of floor space, is under construction for the Champion Spark Plug Co.

J. L. Braff has been appointed Ze-

col, Inc., Milwaukee, Wis., representative for the northwest, and J. L. (Jim) Peasley has been named southeast representative.

V. K. White has been appointed factory service manager of the Auburn Automobile Co., with headquarters at the Auburn, Ind., plant. He has been with the company since 1929 acting as assistant to A. H. McInnis, who recently resigned to take up new duties with the Cord Corp.

U. S. Hammered Piston Ring Co. has announced its removal from Paterson, N. J., to new quarters at Stirling, N. J., where the company has purchased a plant with 40,000 sq. ft. and an eight-acre tract of land.

Neal Taylor Hall has been appointed advertising manager of the Bendix Products Corp., it was announced recently. For the past year Mr. Hall has been advertising manager of the Wurlitzer Co., and prior to that time was an executive of the Burns-Hall Advertising Agency in Milwaukee.

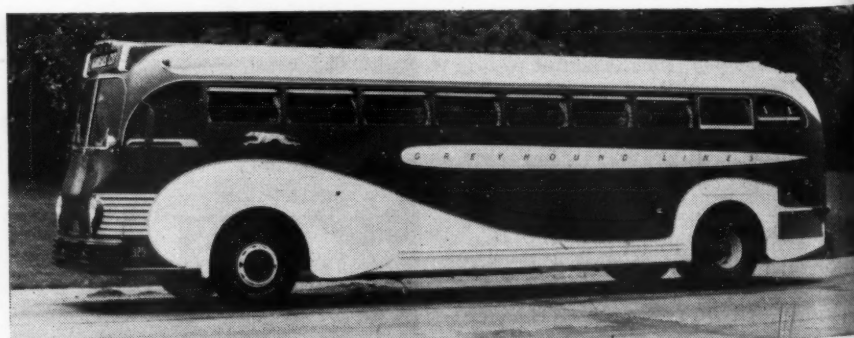
A. N. Benson, who succeeded the late Jack Frost in April as executive head of the National Automobile Dealers' Association with the title of assistant to the president, has been named general manager of the association. Previous to his NADA connection Mr. Benson was general manager of the Minnesota dealers' association.

R. S. Armstrong has resigned from the National Highway Users' Conference. For a number of years he has handled legislative work for the conference. Previously he did somewhat similar work for the National Automobile Chamber of Commerce.

"Red" Williams, working out of Atlanta; Neil W. Jones, out of Richmond, and E. R. Dimmette, out of Greensboro, will sell the Everready line of lubricating equipment for the Rogers Products Co., Inc., of Jersey City, N. J., in the southeast.

J. C. Stiles and Harry Barrett have taken over the Fred Medart Mfg. Company's interest in the Stiles-Medart Co., St. Louis, Mo.

In a joint statement issued by Stiles and Barrett, they announced that the firm name of the Stiles-Medart Co. had been changed to the Stiles-Barrett Corporation.



THE new Greyhound "Super-Coach," in which passengers ride higher for better observation—baggage beneath them in locked compartments. Engine is in the rear

SHOCK

LUBRICATION FOR "SHOCK CONDITIONS"

When starting from cold and before oil is circulating freely - - when the foot is lifted suddenly from the accelerator at high speeds - - when oil is washed from engine walls, pistons and rings due to excessive choking - - when springs run dry and squeaks develop - - those periods when most wear takes place - - when need for a durable, stand-by lubricant is paramount - - then is when the graphoid surface instantly goes to work.

A growing number of oil suppliers are using "dag" colloidal graphite with their oils to facilitate the formation of these graphoid surfaces.

Lubrication merchandisers everywhere are taking advantage of the convincing sales points and performance of colloidal-graphited oils. They are building for themselves profitable sales and good-will. Write for descriptive folder.

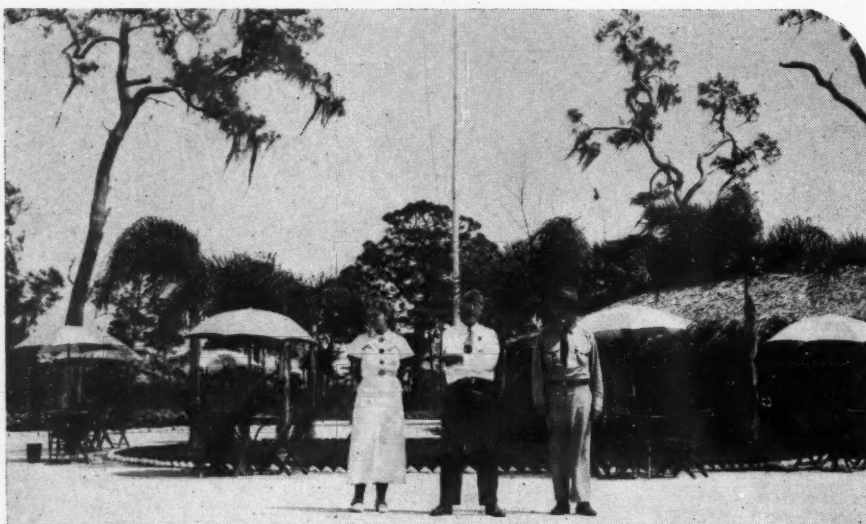
Ask your oil supplier about his colloidal-graphited brands today

ACHESON COLLOIDS CORPORATION ♦ PORT HURON, MICHIGAN



© 1936, A.C.C.

COLLOIDAL GRAPHITE



POINT Welcome, five miles north of Sarasota, Fla., where tourists are invited to stop, rest, ask questions and enjoy refreshing orange juice. Originally sponsored by the local American Legion post, the project proved so successful that it was later taken over by the Sarasota Chamber of Commerce



Weidenhoff Announces New Motor Tune-Up Equipment

Joseph Weidenhoff, Inc., Chicago, Ill., has announced a new motor analyzer, the test instruments of which are in removable units. This makes



it possible for a repair shop to purchase one instrument at a time and gradually build up to a complete analyzer. One of the features claimed for this Motor Tune-Up Tester is that it can be used by more than one mechanic at the same time, since the test instruments may be removed from the stand and operated independently. Calibrated on the "Go and No Go" principle, the instruments are said to be easy to read, and to present an extremely accurate report of existing conditions in the engine. The complete analyzer sells for \$196.25; when purchased in single units, the stand, without units, is \$26.50; Unit No. 1, which is the Vacuum, Compression and Spark Plug

Test Unit, \$37.50; Unit No. 2, containing Voltmeter, Ammeter and Rheostats, \$34.75; Unit No. 3, the Coil Tester, \$48.50; Unit No. 4, for testing condensers, radio suppressors and for resistance tests, \$24; Unit No. 5, containing a Manometer for testing muffler back pressure, fuel pump pressure and suction, and float valve needle, \$25.

Packard to Expand

Anticipating a production in the next twelve months which will far exceed that of any year in its history, the Packard Motor Car Co. is more than doubling the productive capacity of its plant at a cost in excess of \$5,100,000.



BROOMS and dust pans are standard equipment on every Pontiac police car in the city of Pontiac, Mich. Police use these homey instruments to rid the streets of broken glass

Sealed Power Employees to Get Quarterly Cash Bonus

Following a meeting of the stockholders of the Sealed Power Corp., manufacturers of piston rings and pistons, held last month, Neil A. Moore, general manager, announced that in place of the corporation's policy of giving all employees an annual bonus, a quarterly bonus plan had been adopted and would be put immediately into effect.

Mr. Moore stated that the quarterly bonus would be paid by the stockholders to all employees, working either on a salary or on an hourly basis. The plan provides that all employed prior to Jan. 1, 1936, would at this time receive two quarterly bonus checks of \$15 each and that all employed prior to March 1, 1936, would receive one bonus check for \$15 at this time. It was also announced today that all employees would receive another quarterly bonus of \$15 at the end of September.

One of the unique features of this plan is that at the beginning of each quarter, announcement will be made of the amount of the bonus to be paid at the end of that quarter. Mr. Moore stated that bonus payments would amount to approximately \$11,000 per quarter.

New Eastern GM Plant

General Motors Corp. announces it will build a plant for assembly of Buick, Oldsmobile and Pontiac passenger cars for delivery to the East Coast region and to overseas territories at Linden, N. J. The plant, when fully equipped for maximum operation, will represent an outlay of approximately \$5,575,000. Construction will start immediately, with completion scheduled sometime in December.

Eighty acres of ground on the Lincoln Highway near Stiles Street in Linden have been acquired as the site for the new operation, which will be one of the largest automobile assembly plants in the world. It will have a normal capacity of 120,000 cars a year. Two-thirds of the production are scheduled for domestic delivery and one-third for export. Approximately 2000 persons will be employed when the plant is operating at full capacity.

Lathan-Besler Power Brakes For House Trailers

The Lathan Co., Inc., Detroit and San Francisco, announces a new power brake outfit designed for the graduated hand-control of house trailers from the pull-car cab, either independent of or in coordination with the pull-



car brakes. Features of the outfit are said to be ease and speed of installation, and the ease with which any desired braking effect can be applied to the trailer brakes. Prices range as low as \$29.64.

*Jack said the car
was hungry too*

-AND SOLD ME ETHYL!

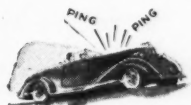
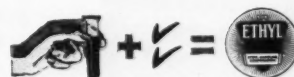


HOW JACK SOLD HIM

(IN 43 SECONDS)

Modern automobiles, with their high compression engines, STARVE on "low compression" gasoline. Their hunger cry is the KNOCK that cuts down power, wastes gas and oil.

the richest in anti-knock quality—the special gasoline sold at pumps marked "Ethyl" on the globe or base.



LOOK OUT for a "pinging" sound when you push down the accelerator to pass another car with safety or to make a hill in high! It means that your motor is knocking and failing to give *all* its power at the times you need it most—that you are wasting gas and oil.

YOU GET at the Ethyl pump:

Enough anti-knock fluid to stand up under the highest engine compression and bring out all the power of your car.

All-round quality that is double-checked—by the oil companies and the Ethyl Gasoline Corporation—at the refinery and at the pump.



THAT'S WHY most oil companies now are improving their gasolines by using anti-knock fluids (containing tetraethyl lead) made by the Ethyl Gasoline Corporation.

These companies recommend as their best year-round fuel—and

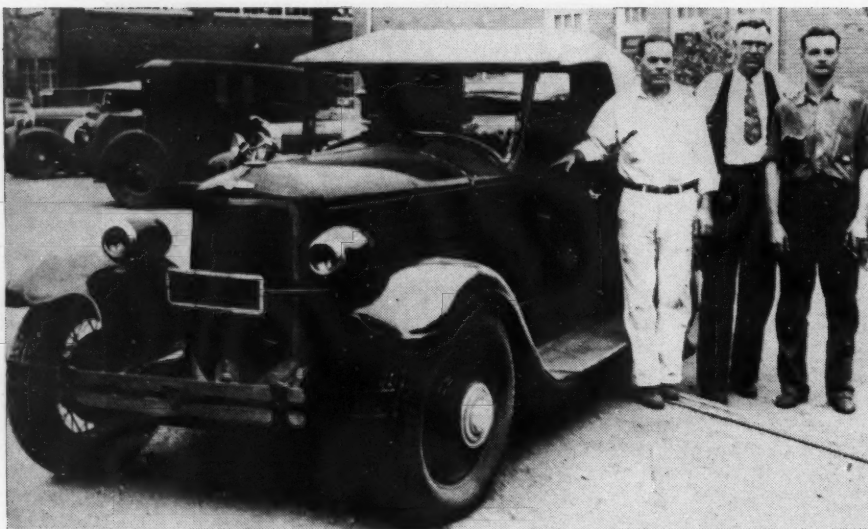
GET RID of that expensive knock! Stop that waste of gas and oil! Give your car the fuel it needs—the gasoline *richest* in anti-knock value—and the highest in quality by every count. Next time get Ethyl!



FOR 100%

ENGINE PERFORMANCE

NEXT TIME GET ETHYL



BEN PRESTON, a mechanic of Wichita, Kan., assembled this roadster from the sound parts of 25 wrecked automobiles. Some parts were from cars of gangsters who met "sudden death" but most were the common variety of traffic accidents. Many deaths occurred in these wrecked cars. Preston is shown in the center of the group.

New Plomb Tool Chest

A mechanic's tool chest, known as No. 9990, has been announced by Plomb Tool Co., Los Angeles, Calif. It is described as weighing 44 lb. empty, with overall length of 24 in., width 11 in., depth 12 $\frac{3}{4}$ in. Arrange-



ment of the box permits a full set of tools to be kept in perfect order. Sockets and handles most used are kept in the cantilever tray under the lid. Tray swings up with the lid, exposing a large center compartment. Two drawers are provided for small special tools.

All Plants Except Ford Are Closed for Retooling

While retooling operations have cut automobile production down to a mere fraction of recent heavy volume, retail sales have held close to normal seasonal decline. This late in the model season other strong influences adversely affecting sales ordinarily come into play, but as yet these apparently have made only a slight impression.

Normally, the closing of plants for

retooling suggests the proximity of new models and immediately creates a sales resistance for old lines. Moreover, depleted dealer stocks offer a limited selection to buyers. Obviously, the sales trend cannot indefinitely resist these factors, but, fortified as the retail market was this year with a potent consumer demand, little more than a seasonal influence can be detected in delivery figures reported to date.

Greater irregularity and a sharper decline in new car deliveries can be expected from now on until new models become available in quantity. Many dealers already have been drawing on their stocks for a whole month without replenishment from factories. Only Ford now remains in production on 1936 passenger cars and a few companies will be shipping new models in volume during September.

16th Annual P.A.A. Convention

The Reading Auto Trade Assn. will be host to the 1936 Convention of the Pennsylvania Automotive Association, with headquarters at the Abraham Lincoln Hotel, Sept. 21 and 22.



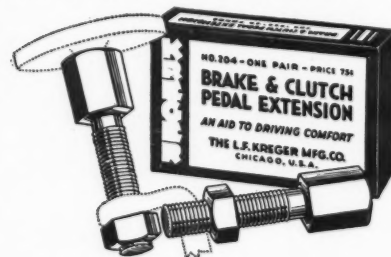
"WILD BILL" Edwards, Pontiac dealer at McCamey, Tex., entered the rattlesnake derby which was held in his town. Here he is at the right on the running board proudly fondling one of his prize racers

Championship Title Event At Syracuse, Sept. 12

The third National Championship title event on this year's card is the 100-mile race at the New York State Fair, Syracuse, on September 12, an annual event dating back more than a decade. In this classic several of the 18 drivers on the title roster have an opportunity to better their positions, but Lou Meyer, Indianapolis winner, who is contemplating the honor as the only man ever to hold the National Championship medal four times—if he wins this year, is safe from the attempts of others to unseat him. The 450 points Ted Horn holds in second place are not sufficient to match Meyer's 600 from Indianapolis, even if Horn should win the 120 points that go with victory at Syracuse.

Kreger Brake and Clutch Pedal Extensions Announced

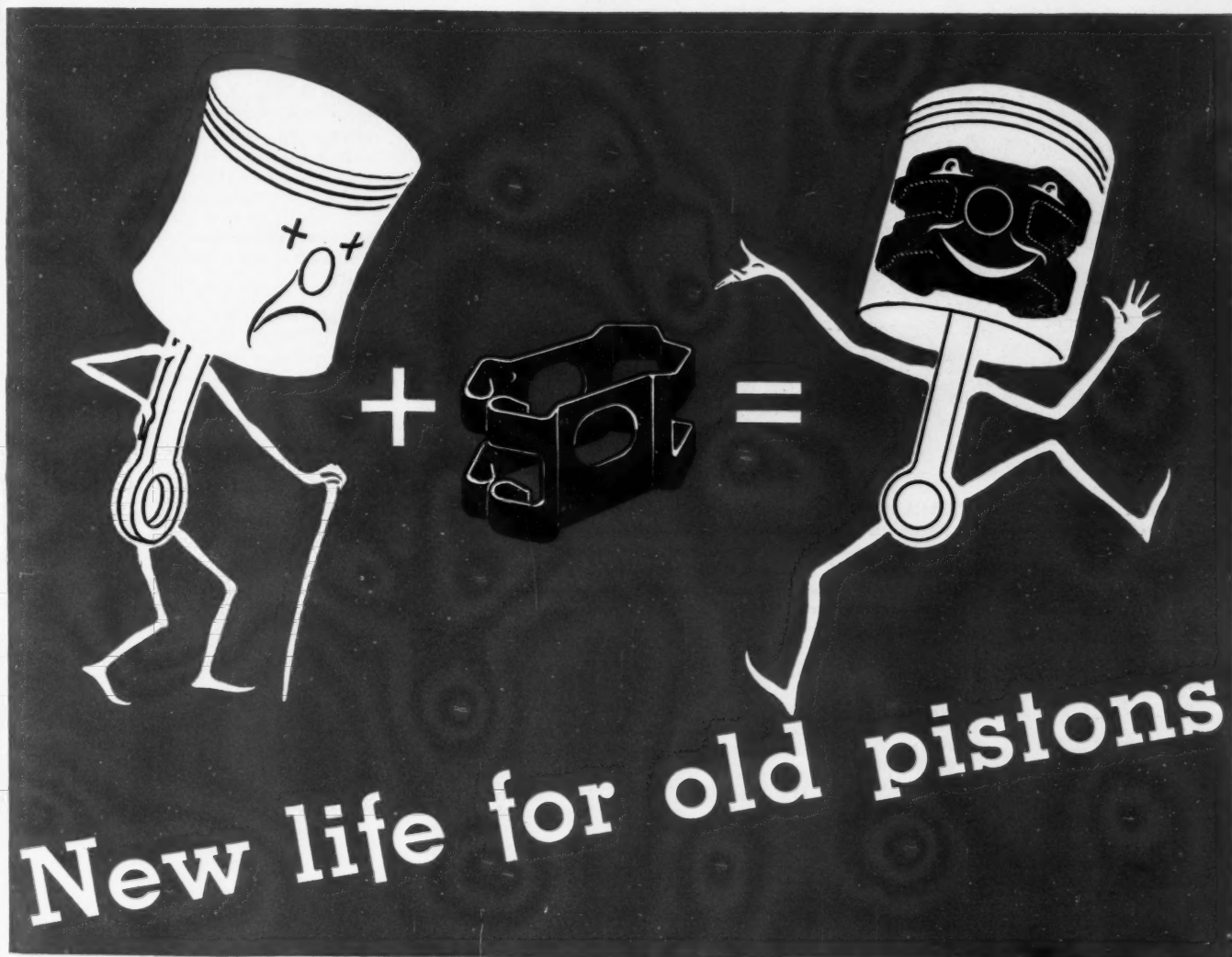
With the introduction of brake and clutch pedal extensions for 1933-36 Ford cars and trucks, the L. F.



Kreger Mfg. Co., Chicago, Ill., has added another product to their line of replacement parts for Ford, Plymouth and Chevrolet cars. These extensions are said to screw on the regular clutch and brake pedals, and are adjustable to any required length. Sold in pairs.

N.A.D.A. Moves Headquarters

Headquarters of the National Automobile Dealers' Association will be moved from St. Louis, Mo., to Detroit, Mich., center of the automotive industry, sometime during September, it was announced today by Arnon N. Benson, general manager of the association. Offices will be located on the 14th floor, Hotel Statler.



● Aluminum pistons *need* rejuvenating whenever they've run long enough to need new rings. They're bound to be worn, collapsed or distorted. Installation of Perfect Circle Piston Expanders is the only sure method of restoring such pistons to their original fit and efficiency. The installation is simple as A-B-C.

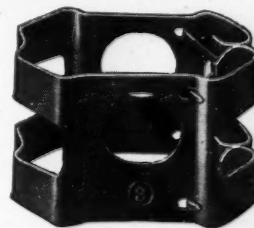
There is no guesswork about Perfect Circle Piston Expanders. They are specifically engineered for each different type of piston. Scientific

expansion at ten correctly located points restores the piston, and automatically maintains the right piston clearances throughout the life of the job.

Pistons can't collapse again after you install Perfect Circle Piston Expanders—they're permanent. The expanders are securely locked in place by the piston pin. They can't work loose, and they never wear out. *Always* install them when you're installing new rings on aluminum

pistons. You'll be sure of a satisfied customer and a good profit.

Perfect Circle Piston Expander for Ford V-8



U. S. PATENT NOS. 1,885,038 DATED OCTOBER 25, 1932,
AND 1,951,837 DATED MARCH 20, 1934

THE PERFECT CIRCLE COMPANIES • HAGERSTOWN, INDIANA, and TORONTO, CANADA

PERFECT CIRCLE

REG. U. S. PAT. OFF.

PISTON EXPANDERS



HIGH INTENSITY MERCURY FLOODLIGHTING for service station in East Orange, N. J., using Westinghouse High Intensity Mercury lamps, produces a light of high efficiency, enhances appearance of the building and grounds after dark. A total of nine 400-watt high intensity mercury vapor lamps and five 500-watt lamps in floodlight projectors are used.

Ford Organization Plays Host To Independents

More than 100,000 independent garagemen and fleet owners and their families have been guests of Ford Motor Company parts distributors in Eastern and Mid-West centers at a series of special entertainment programs held during the summer.

The meetings were planned as an expression of appreciation of Ford distributors and dealers for the volume of Ford parts business. Entertainments in Chicago and Boston, in July, attracted crowds of 22,000 and 20,000 respectively.

Other meetings in Philadelphia, St. Louis, Newark, New York and Brooklyn filled the cities' largest theatres to capacity, the Boston and Chicago events requiring the use of sports stadia. The most recent program, that at Des Moines, Ia., was held in a city park with more than 15,000 persons present. A 1936 Ford V-8 was awarded one of the guests.

Pontiac Has Plan For New Car Service

An innovation in new car service policies which it is believed will be an added convenience to owners is being introduced through the dealer organization of the Pontiac Motor Co., according to C. P. Simpson, vice-president and general sales manager.

"Heretofore, it has been necessary for new car buyers to have their cars serviced at the 500 and 1500 mile marks in the shops of the dealers where they bought their cars," Simpson explained.

"Oftentimes owners have had to go out of their way to drive back to the point of purchase. In the summer months this has frequently meant additional expense to the owner for service given gratis by the factory and dealer.

"The new service plan is extremely simple in operation, permitting owners of new Pontiacs to have their cars serviced at any authorized Pon-

tiac dealer in the United States. All they have to do is to present their service identification cards to the dealer and the work is done free, according to Pontiac's service plan."

De Soto's New \$5,000,000 Plant to Open This Month

K. T. Keller, president of Chrysler Corp., has announced that, to take care of De Soto's growing business, a new automobile plant will be opened in Detroit this month for the production of De Soto passenger cars. This will give De Soto, for the first time, an exclusive plant of its own. With the opening of the new plant, each of the corporation's major lines of cars and trucks will be built in separate plants.

New Sales Policy On Norwalk Fan Belts

The Norwalk Tire & Rubber Company has inaugurated a simplified selling policy for dealers and jobbers to buy and sell Norwalk Gold Standard Black Carbon Fan Belts. The entire belt coverage on 70 V type belts is all shown on one sheet in six different price groupings. The price groupings are based on car popularity.

This new plan has been responsible for Norwalk dealers as well as jobbers to more than double their Fan Belt volume over the same period last year, the factory stated.

McCord Announces New Line of Car Heaters

McCord Radiator & Mfg. Co., Detroit, Mich., has announced a new line



of hot water car heaters, ranging in price from \$9.95 to \$19.95. Described as having new style design and colorful iridescent finish, the new heaters are said to mount 4 to 5 in. closer to the dash, in the center back of the gear shift lever, for better heat distribution.

Up-to-date Flat Rate Information

Dodge D 2 1936

Opr. No.	Mfr. hrs.	Opr. No.	Mfr. hrs.	Opr. No.	Mfr. hrs.	Opr. No.	Mfr. hrs.
A7x	2.1	C6	.4	L1	6.0	R4	1.5
A7Y	1.0	C7x	.6	L1A	4.5	R4B	3.0
A9x	.4	C11	1.2	L4	.3	S7	1.5
A11	1.5	C12	2.2	L6	.8	S8	1.5
A12	2.4	D4	.6	L7	2.5	U2	.6
A14	3.0	D6	.5	L7A	.1	U4	8.8
A16	.5	D7x	1.5	L11	.5	U6x	.5
B3	.5	D10	.5	M1	2.7	U7x	.4
B6	.7	D11x	1.5	M4	3.4	U9	1.0
B8	2.0	D12	1.0	O1	.5	U10	1.3
B12	1.3	D13	.7	O3	3.0	U12	.7
B13	4.3	FH5	5.5	O4	3.0	U13	1.0
B18x	1.0	F6	1.2	O6	1.0	U16	.4
B20	1.0	F10	1.6	O11	4.5	U19	.5
B22	.5	F13	1.2	O12	.6	V1	2.0
C1	4.0	F15	1.9	P1	2.5	V2	2.7
C2	1.8	F19	.4	P3	6.0	V3	1.2
C3x	4.5	G11	4.5	P6	3.0	V5	1.0
C4x	.5	H5x	1.8	Q1	1.0	W5	.6
C5	.4	H5A	.4	Q2	1.0	X5	1.0

ABBREVIATIONS—

8B13	Includes bleed lines
8FH5	Includes inspect all bearings
8F10	Includes remove carbon

8H5x	Alignment not included, rod not removed
8U4	Includes retime

SAFE NIGHT DRIVING SPEED DEPENDS ON HEADLIGHTS

With GOOD brakes and lights properly aimed, this chart shows approximate safe speeds for an alert driver with normal vision

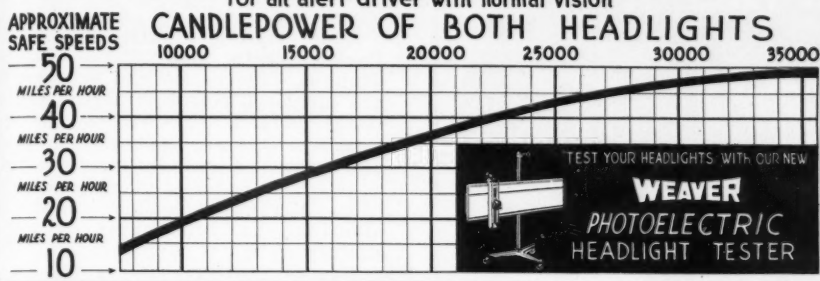
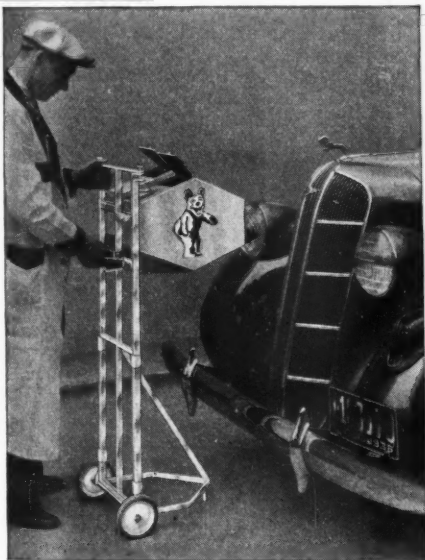


CHART supplied by Weaver Mfg. Co. graphically indicates safe night driving speeds, based on headlight beam intensity and normal stopping distance

New Bear Headlight Tester

Bear Mfg. Co., Rock Island, Ill., has developed a new headlight tester which is said to be on a new principle in that it uses two scientific ray selectors in testing each lamp. These ray selectors are mounted side by side



and are adjustable up and down. By raising or lowering the selectors it is claimed that the reflected rays from every part of the lamps can be tested, rays from other parts of the reflector being shut out while one part is being tested.

New Battery Charger

Announced by Baldor

The Baldor Electric Co., St. Louis, Mo., makers of "Handy" battery chargers, announces new improved garage type battery chargers in four sizes. Illustration is of the 12-B Wall Type Charger, 110 volt, 50 or 60 cycle, designed to charge from one to twelve batteries at 6 amperes. "Handy" chargers are said to be automatic in operation, and will operate



regardless of how many times current goes on and off without discharging the battery. Priced at \$29.50 less bulb.

New Device For Installing Emergency Chains

A new device, listing for 25 cents, has been announced by T A T Products, Montclair, N. J., for simplifying the installation of emergency tire chains. The device attaches to the



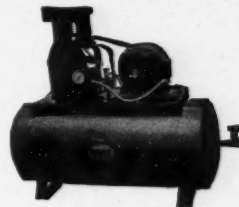
end of the chain strap and guides the strap over the tire and through the spokes of the wheel. It is claimed that three emergency chains per wheel can be installed without having to move the car.

Signal Electric Mfg. Co., Menominee, Mich., will build a two-story addition to its plant, the cost to be \$20,000.

Scott Air Compressor

For Service Stations

The Scott Air Compressor Co. Philadelphia, Pa., manufactures a complete line of air compressors for service station use. Illustration is of Model H-30, single-stage horizontal type. It is said to be completely auto-

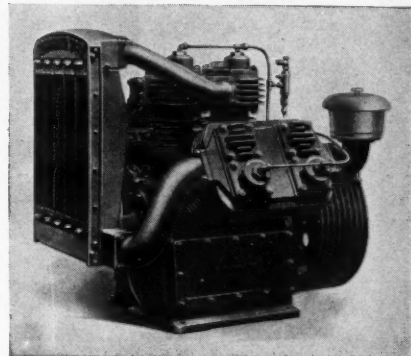


matic, and to be suitable for use where requirements do not exceed 150 lb. pressure. Many improvements are said to be incorporated in the new compressor, including the Scott centrifugal oiling system to continuously supply all working parts with a plentiful supply of clean oil.

Worthington Announces

New Air Compressors

A new line of three and six-cylinder vertical angle two-stage air compressors has been announced by Worthington Pump and Machinery Corp., Harrison, N. J., with capacities ranging from 142 to 445 cu. ft. per minute. The three-cylinder unit is



described as having two low-pressure cylinders set opposite each other at an angle, with a high-pressure cylinder set vertically between them. A large oil reservoir in the crankcase, force feed lubrication, an oil cooler and an oil filter are other features claimed for these new compressors.

Bendix Makes Radio Tester

Radio Products Corp., a new subsidiary of Bendix Products Corp., has been announced by Vincent Bendix. It will manufacture a new invention, the Bendix-Dayrad testing unit for automobile radios. The new Bendix-Dayrad unit will be able to detect the weak spots not only in the radio but in the ignition system of the car, it is claimed.

Wisconsin Machinery & Mfg. Co., Milwaukee, Wis., makers of pistons, dry cylinder sleeves and cylinder sleeve assemblies, broke ground for an addition to its plant, Aug. 24.

HEIN-WERNER SCORES AGAIN WITH THIS NEW

MODEL
2.95 A

2 TON LIGHT TRUCK Special

First In
The Field

Built Right
Priced
Right

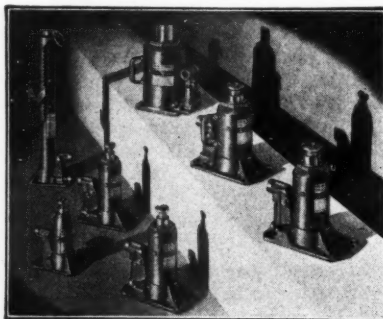
\$4¹⁵
NET TO
DEALER



... Ideal for Chevrolet,
Ford and other light trucks

There is nothing on the market to compare with this sensational new model. ... It meets the great existing need for a hydraulic jack *designed especially for light trucks*. ... It, like all other Hein-Werner Hydraulic Jacks, is *built right and priced right*.

This new Model 2.95A is tested at 1½ times its rated capacity of 2 tons. ... Has 7" lift to a total height of 16½". ... List Price \$5.95. ... Dealer Price \$4.15 (West Coast List \$6.45. ... Dealer Price \$4.55).



A Complete Line . . .

Other models in this line include the "Bullet" Model, 1½ ton capacity at \$2.80 (West Coast \$3.10). . . . For light trucks, 3 ton models at \$7.95 (West Coast \$8.45). . . . 5 ton models \$9.95 (West Coast \$10.65). . . . For medium heavy trucks, motor coaches and shop use—7 ton models \$13.45 (West Coast \$14.50). . . . For heavy trucks, buses and shop use—12 ton models \$19.95 (West Coast \$21.00). . . . 20 ton models \$30.00 (West Coast \$31.00)—and for modern passenger cars, our new BUMPER-LIFT Model at a new low price of \$4.95 (West Coast \$5.65). . . . Above prices are net to dealer.

HEIN-WERNER MOTOR PARTS CORP.
Waukesha, Wisconsin

FEW MODELS ENGINEERED TO DO THE WORK OF MANY
HEIN-WERNER
hydraulic JACKS

Packard Adds New 6

(Continued from page 29)

protected by thermostatic control instead of fuses. Thermostatic control also is used for cigar lighters, causing the current to cut off automatically when heated.

Body styling is characteristically Packard with many detail exterior changes. Bodies for the Six and 120 are identical except for trim and interior details. Bodies on the two larger models are the same composite construction although somewhat lighter due to refinement of structural details. Radiator treatment on the Senior lines has been improved with a slightly narrower frontal width. Full automatic control shutters are standard on the Senior lines. Louvre treatment on the Six is the same as last year's 120, so that the Six has practically the same appearance as last season's 120. The 120 has a similar louvre treatment to last year's Eight, while the Super-Eight carries a refinement of the former design and the Twelve remains the same.

Returning to the engine, blocks are made of special chromium and nickel semi-steel alloy which has proved to be beneficial in increasing cylinder life. Oil-bath air cleaners are used on all models except the Twelve, which continues the type formerly used. Vibration dampers are standard throughout, as is the two-sprocket chain drive at the front end. All engines have improved starting and idling characteristics. The Senior line is fitted with a new type oil cooler having all joints copper-bronzed, assuring trouble-free service. Vacuum spark control, in addition to governor advance, is standard on all models except the Twelve, which has governor control only.

Mufflers have been greatly improved. All models except the Six are fitted with twin-tandem tuned resonance mufflers, producing exceptional silencing quality and materially reducing back pressure. The Six uses the same type of muffler except that it is a single unit.

Engines are all fitted with the new X-90 damper type piston rings which produce improved oil control and minimize blow-by by preventing ring flutter. Packard has found that these rings greatly reduce oil consumption, particularly at high speeds, and improve cylinder life. The Six and 120 use three rings—two 70's and one X-90; the Super-Eight has four rings, one plain compression, one 70, one 85, and one X-90; the Twelve has four rings, one plain, two 70's and one X-90.

The Six is fitted with the new Chandler-Grove downdraft carburetor with concentric float and built-in automatic choke. Pistons for the Six are Bohn thermostatic aluminum alloy with strut, slotted, cam-ground slightly, and tin-plated; pistons on all other engines are the former aluminum alloy with strut.

On the Super-Eight full pressure lubrication has been extended to rocker arm bearings to provide ample feed at low operating speeds. Increased cooling capacity is a feature of the entire line and this, coupled with careful attention to the details concerned with vapor locking, contribute great-

ly to better performance on the road. In this connection, both the Six and the 120 are fitted with a new fuel pump having greater vapor capacity and improved cooling.

All engines are fitted with precision-type removable bearings for the mains and connecting rod—babbitt alloy on the Six and 120; copper-lead on Super-Eight and Twelve engines.

Seven Keys

(Continued from page 31)

names and photographs of the entire department personnel appear in direct mail advertising dispatched to customers.

Sixth, *Instantaneous Service*. This is achieved in an alert, carefully trained selling group. The floor salesmen are provided with a booth just at the entrance to the service floor. This booth is equipped with telephones, salesbooks. This means that the floorman can telephone orders to stock room, and conduct all other company business, such as asking for charge authorizations, without the customers hearing the 'phone conversation.

Seventh, the factor of *Customer Contact*. Commercial Tire men are encouraged to make each customer contact a diversified sale! This means that the Commercial Tire volume is built on quite the reverse of high pressure, according to their own statements. For example, the man who sells a battery recharge (when he could have forced the sale of a new battery) gets more credit if he sells the motorist materials and services of other departments, provided the car owner needs those materials and services, of course.

"What we want to do," says Mr. Hawkins, "is to sell what the customer wants, and if possible whatever else he needs. In short, the diversified sales, or what is necessary to the motorist's convenience and comfort, rather than working for a big sales and a big commission. We don't care whether the sales involves a dollar or a hundred dollars, so long as it is what the customer wants—plus what the customer needs!"

\$2,000,000 More Bonus

For Chrysler Employees

In appreciation of the cooperative efforts of the employees of Chrysler Corp., and the successful results of this car model year, it has been decided to distribute an additional \$2,000,000 to employees.

Every employee now on the payrolls who was on the payroll during any part of the fourth quarter of 1935 will participate. In the distribution of this fund, length of service of employees will be given recognition.

The minimum amount to any eligible employee will be \$25. An extra amount over and above this minimum will be paid for each additional year of service at the rate of one dollar per year, up to and including 10 years. Eligible employees will receive this additional compensation on their first regular pay day falling on or after Aug. 10.



Chicago Accident Prevention cars are alert to the hazards and dangers of mis-alignment. Illustrated is one of Chicago's Accident Prevention cars receiving an accurate Bee-Line Alignment checking on the Excel Spring Company's Master Bee-Line Aligner.

The Excel Spring Company is only one of the many Bee-Line Service Stations in Chicago.

The Excel Spring Company first installed one complete Master Bee-Line Aligner. Soon the increased demand for this outstanding service necessitated their installing a Super Model Heavy Duty Bee-Line Aligner.

Today this company is enjoying a very successful business, and their Bee-Line Equipment is complete in every detail . . . so that they can handle every kind of motor vehicle, including the largest busses, trucks and trailers.

Safety movements are rapidly spreading to all parts of the country, and aggressive shop owners are realizing the importance and the necessity of having proper and adequate equipment.

You, too, have the opportunity to start in this specialized service which represents protection for the car owner and opens a field of unlimited profit.

Write today for complete particulars. A Bee-Line representative in your territory will explain our convenient deferred payment plan.

BEE-LINE MFG. COMPANY

DAVENPORT, IOWA

Mechanical Specifications

These Specifications Are Brought Up-to-Date Each Month by the

Line Number	MAKE AND MODEL	Lowest Priced 4-door Sedan	Wheelbase (Ins.)	Tire Size (Ins.)	ENGINE														CHASSIS					
					No. of Cylinders, Bore and Stroke	Taxable H.P.	Piston Displacement (Cu. Ins.)	Maximum Brake H.P. at Specified R.P.M.	Compression Ratio (to-1)	Displacement Factor ††	Cylinder Head Material	Camshaft Drive Make	Piston Material	Oil Cleaner Make	Air Cleaner Make	Carburetor Make	Muffler Make	Electrical System Make	Battery Make	Clutch	Gearset Make	Universal Type and Make	Rear Axle Type and Make	Service Brake Make and Type
1	Auburn..... 654	\$ 795	120	6.00/16	6-3 1/2 x 4 1/2	22.5	209.9	85-3500	6.20	37.4	Al.	Whit.	Al...	Pur...	AC...	Str....	Buf...	A...	USL	P.Long.	WG...	Nb-Mec	1/2 Col...	BH...
2	Auburn..... 852	1095	127	6.50/16	8-3 1/2 x 4 1/2	30.0	279.9	115-3600	6.50	41.4	Al.	Whit.	Al...	Pur...	AC...	Str....	Buf...	A...	USL	P.Long.	Det...	Nb-Mec	1/2 Col...	BH...
3	Auburn..... SC852	1545	127	7.00/16	8-3 1/2 x 4 1/2	30.0	279.9	150-4000	6.50		Al.	Whit.	Al...	Pur...	AC...	Str....	Buf...	A...	USL	P.Long.	Det...	Nb-Mec	1/2 Col...	BH...
4	Austin.....	75	3.75/18	4-2.2x3	7.8	45.6	13-3200	5.30			CL.	Spir.	Al...	No...	No...	Til....	Buf...	A...	USL	P.Rock.	WG...	F-Spi...	1/2 Sal...	M.m.
5	Buick..... 36-40	885	118	6.50/16	8-3 1/2 x 3 7/8	30.6	233.0	93-3200	5.65	39.6	CL.	LB.	Ala...	No...	AC...	Str....	Wal...	D...	Del...	P.Own.	Own.	m-Spi...	1/2 Own...	OH...
6	Buick..... 36-60	1090	122	7.00/15	8-3 1/2 x 4 1/2	37.8	320.2	120-3200	5.45		CL.	LB.	Ala...	AC...	AC...	Str....	Wal...	D...	Del...	P.Own.	Own.	m-Spi...	1/2 Own...	OH...
7	Buick..... 36-80	1255	131	7.00/16	8-3 1/2 x 4 1/2	37.8	320.2	120-3200	5.45	40.7	CL.	LB.	Ala...	AC...	AC...	Str....	Wal...	D...	Del...	P.Own.	Own.	m-Spi...	1/2 Own...	OH...
8	Buick..... 36-90	1695	138	7.50/16	8-3 1/2 x 4 1/2	37.8	320.2	120-3200	5.45		CL.	LB.	Ala...	AC...	AC...	Str....	Wal...	D...	Del...	P.Own.	Own.	m-Spi...	1/2 Own...	OH...
9	Cadillac..... V8-60	1695	121	7.00/16	8-3 1/2 x 4 1/2	36.4	322.0	125-3400	6.25	45.7	CL.	Mor.	Ala...	No...	AC...	Str....	Old...	D...	Del...	P.Long.	Own.	Nb-Mec	1/2 Own...	BH...
10	Cadillac V8-70 & 75	2445	131-38	7.50/16	8-3 1/2 x 4 1/2	39.2	346.0	135-3400	6.25	(a)	CL.	Mor.	Ala...	No...	AC...	Str....	Old...	D...	Del...	P.Long.	Own.	Nb-Mec	1/2 Own...	BH...
11	Cadillac V12-80 & 85	3145	131-38	7.50/16	12-3 1/2 x 4	46.9	368.0	150-3600	6.00	(b)	CL.	Mor.	Ala...	Han...	AC...	DL....	Old...	D...	Del...	P.Own.	Own.	Nb-Mec	1/2 Own...	BH...
12	Cadillac..... V16-90	7250	154	7.50/17	16-3x4	57.5	452.0	185-3800	6.00	43.7	CL.	Mor.	Ala...	Cu...	AC...	DL....	Own...	D...	D...	dp.Own.	Own.	Nb-Mec	1/2 Own...	OP...
13	Chevrolet. Mas. Con.	640	113	5.50/17	6-3 1/2 x 4	26.3	206.8	79-3200	6.00	35.2	CL.	Own.	CL...	No...	AC...	Car...	Own...	D...	D...	P.Own.	Own.	m-Own.	1/2 Own...	OH...
14	Chevrolet. Mas. Ind.	113	113	5.50/17	6-3 1/2 x 4	26.3	206.8	79-3200	6.00	34.6	CL.	Own.	CL...	No...	AC...	Car...	Own...	D...	D...	P.Own.	Own.	m-Own.	1/2 Own...	OH...
15	Chevrolet..... Std.	575	109	5.25/17	6-3 1/2 x 4	26.3	206.8	79-3200	6.00	39.5	CL.	Own.	CL...	No...	AC...	Car...	Own...	D...	D...	P.Own.	Own.	m-Own.	1/2 Own...	OH...
16	Chrysler..... Six	875	118	6.25/16	6-3 1/2 x 4 1/2	27.3	241.5	93-3400	6.00	41.5	CI*	Ch...	Ala...	Pur...	Bur...	Car...	NS...	A...	Wil...	P.B&B.	Own.	Nb-UP.	1/2 Own...	LH...
17	Chrysler..... DeLuxe 8	1045	121	6.50/16	8-3 1/2 x 4 1/2	33.8	273.8	105-3400	6.20	43.3	CI*	Ch...	Ala...	Pur...	AC...	Str....	NS...	A...	Wil...	P.B&B.	Own.	Nb-UP.	1/2 Own...	LH...
18	Chrysler..... Airflow 8	1345	123	7.00/16	8-3 1/2 x 4 1/2	33.8	323.5	115-3400	6.20	41.8	CI*	Ch...	Ala...	Pur...	AC...	Str....	Bur...	A...	Wil...	P.B&B.	Own.	Nb-UP.	1/2 Own...	LH...
19	Chrysler Air. Imp. 8	1475	128	7.50/16	8-3 1/2 x 4 1/2	33.8	323.5	130-3400	6.50	42.4	AL.	Ch...	Ala...	Pur...	AC...	Str....	Bur...	A...	Wil...	P.B&B.	Otwg.	Nb-UP.	1/2 Own...	LH...
20	Chrysler Air.Cus.18	137	137	7.50/16	8-3 1/2 x 4 1/2	33.8	323.5	130-3600	6.50		AL.	Ch...	Ala...	Pur...	AC...	Str....	Bur...	A...	Wil...	P.B&B.	Otwg.	Nb-UP.	1/2 Own...	LH...
21	Cord..... 810	1095	125	6.50/16	8-3 1/2 x 3 3/4	39.2	288.6	125-3500	6.50		AL.	Whit.	Al...	No...	AC...	Str....	Buf...	A...	USL	P.Long.	Own.	Tu Own	LH...	
22	De Soto. Airstream 6	810	118	6.25/16	6-3 1/2 x 4 1/2	27.3	241.5	93-3400	6.00	(c)	CI*	Ch...	Ala...	Pur...	Bur...	Car...	NS...	A...	Wil...	P.B&B.	WG...	Nb-UP.	1/2 Own...	LH...
23	De Soto..... Airflow 6	1095	115 1/2	6.50/16	6-3 1/2 x 4 1/2	27.3	241.5	100-3400	6.50	35.6	AL.	Ch...	Ala...	Pur...	AC...	Str....	NS...	A...	Wil...	P.B&B.	Own.	Nb-UP.	1/2 Own...	LH...
24	Dodge..... Six	735	116	6.00/16	6-3 1/2 x 4 1/2	25.3	217.8	87-3600	6.50	40.0	CL.	Ch...	Ala...	Pur...	AC...	Str....	NS...	A...	Wil...	P.B&B.	Own.	Nb-UP.	1/2 Own...	LH...
25	Duesenberg..... J	142-153 1/2	142-153 1/2	7.00/19"	8-3 1/2 x 4 1/2	45.0	419.7	320-4200	5.20		CL.	LB...	Al...	Pur...	Y...	Str....		D...	Exi...	dp.Long	Own.	m-Spi...	1/2 Own...	PH...
26	Ford..... V8	580	112	6.00/16	8-3 1/2 x 3 3/4	30.0	221.0	85-3800	6.30	41.2	Al.	Gear	Al...	No...	Yes	Str....	Own...	O...	Own.	P.Os....	Own.	m-Own.	1/2 Own...	OM...
27	Graham..... 6-80	665	111	6.00/16	6-3x4	21.6	169.6	70-3500	6.80	37.1	Al.	LB...	Als...	No...	AC...	Mar...	Old...	D...	Wil...	P.Ill...	WG...	Nb-Spi...	1/2 Spi...	OH...
28	Graham..... 6-80A	625	111	5.25/17	6-3x4	21.6	169.6	70-3500	6.80		Al.	LB...	Als...	No...	AC...	Mar...	Old...	D...	Wil...	P.Ill...	WG...	Nb-Spi...	1/2 Spi...	OH...
29	Graham..... 6-90	795	115	6.00/16	6-3 1/2 x 4 1/2	25.3	217.8	85-3300	6.70	39.7	Al.	LB...	Als...	No...	AC...	Mar...	Old...	D...	Wil...	P.Ill...	WG...	Nb-Spi...	1/2 Spi...	OH...
30	Graham..... 6-90A	745	115	6.00/16	6-3 1/2 x 4	25.3	199.1	80-3300	6.70	44.2	Al.	LB...	Als...	No...	AC...	Mar...	Old...	D...	Wil...	P.Ill...	WG...	Nb-Spi...	1/2 Spi...	OH...
31	Graham S. C. 6, 110	885	115	6.25/16	6-3 1/2 x 4 1/2	25.3	217.8	112-4000	6.70		Al.	LB...	Als...	Fram	AC...	Mar(s)	Old...	D...	Wil...	P.Ill...	WG...	Nb-Spi...	1/2 Spi...	OH...
32	Hudson..... 6-63	785	120	6.00/16	6-3x5	21.6	212.0	93-3800	6.25	39.3	CI*	Ge*	Al...	No...	AC...	Car...	Old...	A...	Nat...	P.Own†	Own.	Nb-Spi...	1/2 Own...	BH...
33	Hudson..... 8, 64-5-6-7	830	120-127	6.25/16	8-3x4 1/2	28.8	254.0	113-3800	6.00	(d)	CL.	Ge*	Al...	No...	AC...	Car...	Old...	A...	Nat...	P.Own†	Own.	Nb-Spi...	1/2 Own...	BH...
34	Hupmobile..... 618-G	855	118	6.00/16	6-3 1/2 x 4 1/2	29.4	245.3	101-3600	5.75	45.4	CL.	Mor...	Als...	No...	Bur...	Car...	Old...	A...	Wil...	P.B&B.	WG...	Nb-Spi...	1/2 Spi...	LH...
35	Hupmobile..... 621-N	1035	121	6.50/16	8-3 1/2 x 4 1/2	32.5	303.2	120-3500	5.80	47.3	CL.	Mor...	Als...	No...	Bur...	Car...	Old...	A...	Wil...	P.Long.	WG...	Nb-UP.	1/2 Spi...	LH...
36	Lafayette..... 3610	675	113	6.00/16	6-3 1/2 x 4 1/2	25.3	217.7	83-3200	5.61	39.4	CL.	Whit.	Als...	No...	AC...	Str....		A...	USL	P.B&B.	Own.	Nb-UP.	1/2 Own...	BH...
37	La Salle..... 36-50	1185	120	7.00/16	8-3x4 1/2	28.8	248.0	105-3600	6.25	39.0	CL.	Whit.	Al...	No...	AC...	Str....	Old...	D...	Del...	P.B&B.	Own.	Nb-Mec	1/2 Own...	BH...
38	Lincoln..... Zephyr	1275	122	7.00/16	12-2 3/4 x 3 3/4	36.3	267.3	110-3900	6.7	42.5	Al.	Gear	St...		Yes.	Str....	Own...	O...	Own.	P.Os....	Own.	m-Own	1/2 Own...	MO...
39	Lincoln..... V12	136-145	136-145	7.50/17	12-3 1/2 x 4 1/2	46.8	414.0	150-3400	6.38	41.5	Ala.	Ch...	Ala...	Pur...	Yes.	Str....	Own...	A...	Exi...	P.Long.	Own.		FF Tim.	M...
40	Nash..... Ambassador	885	125	6.25/16	6-3 1/2 x 4 1/2	27.3	234.8	93-3400	5.70	36.8	CL.	Whit.	Als...	Own.	AC...	Str....		A...	USL	P.B&B.	Own.	Nb-Mec	1/2 Own...	BH...
41	Nash..... Amb. Super 8	995	125	6.50/16	8-3 1/2 x 4 1/2	31.2	260.8	102-3400	5.25	36.5	CL.	Ch...	Als...	Own.	AC...	Str....		A...	USL	P.B&B.	Own.	Nb-Mec	1/2 Own...	BH...
42	Nash..... 400	740	117	6.00/16	6-3 1/2 x 4 1/2	27.3	234.8	90-3400	5.61	42.2	CL.	Whit.	Als...		AC...	Str....		A...	USL	P.B&B.	Own.	Nb-UP.	1/2 Own...	BH...
43	Oldsmobile..... F36	795	115	6.50/16	6-3 1/2 x 4 1/2	26.3	213.3	90-3400	6.00	39.2	CL.	Whit.	Ala...	No...	AC...	Car...	Hay...	D...	D...	P.B&B.	Own.	Nb-Mec	1/2 Own...	BH...
44	Oldsmobile..... L36	910	121	7.00/16	8-3x4 1/2	28.8	240.3	100-3400	6.20	40.2	CL.	Whit.	Ala...	No...	AC...	Car...	Buf...	D...	D...	P.B&B.	Own.	Nb-Mec	1/2 Own...	BH...
45	Packard..... 115C-37	115	115	6.50/16	6-3 1/2 x 4 1/2	28.3	237.0	100-3600	6.30		CL.	Mor...	Als...	No...	AC...	CG...		D...	Wil...	P.....		Nb-Mec	1/2 Own...	H...
46	Packard..... 120C-37	120	120	7.00/16	8-3 1/2 x 4 1/2	33.8	282.0	120-3800	6.50	41.8	AL.	Mor...	Als...	No...	AC...	Str....	Old...	A...	PD	P.....	Own.	Nb-Mec	1/2 Own...	H...
47	Packard 1500, 1, 2-37	127-34-39	127-34-39	7.50/16	8-3 1/2 x 5	32.5	320.0	135-3200	6.80		AL.	Mor...	Als...	No...	AC...	Str....			PD	P.....	Own.	Nb-UP.	1/2 Own...	H...
48	Packard 1506-7-8-37	132-39-44	132-39-44	8.25/16	12-3 1/2 x 4 1/2	56.7	473.0	175-3200	6.40		AL.	Mor...												

Tune-Up Specifications

Car Manufacturers and Supersede All Others Previously Published

Service Brake Make and Type	Steering Gear Make	Compression Pressure at Cranking Speed (Lbs.)	Spark Plug Make and Type	RINGS		VALVES										IGNITION					FRONT AXLE						Line Number					
				No. and Width Comp.	No. and Width Oil	Piston Pin Diameter	Piston Pin Locked in	Head Diameter and Seat Angle			Operating Tappet Clearance		Intake Valve Opens Before or After T.C.	No. of Flywheel Teeth	No. Teeth on Flywheel	Breaker Points Gap (Ins.)	Spark Plug Gap (Ins.)	Timing		Rods Removed From	Crankpin Diameter (Ins.)	Crankpin Length (Ins.)	Capacity Crankcase (Qts.)	Capacity Cooling System (Qts.)	Caster (Degrees)	Camber (Degrees)		Toe-in (Inches)	King Pin Inclination (Degrees)			
								Inlet (Ins.)	Exhaust (Ins.)	Exhaust Seat Angle (Degrees)	Inlet	Exhaust						Inlet Tappet Clearance for Valve Timing	No. of Degrees											Spark Occurs °TC	No. of Flywheel Teeth Spark Occurs TC	
BH.	R.	Ch-J-6	2-1/2	1-1/2	3/8	R.	1 1/2	30	1 1/2	45	342	010H	010H	012	7 1/2	2 1/2	110	018	025	3B...	1B...	Au	B	2 1/2	1 1/2	6 16	3 1/2-4	1.5	3/8	7 1/2	1	
BH.	R.	Ch-J-6	2-1/2	1-1/2	3/8	R.	1 1/2	30	1 1/2	45	342	010H	010H	012	7 1/2	2 1/2	110	018	025	3B...	1B...	Au	B	2 1/2	1 1/2	8 20	2-3	1.5	3/8	7 1/2	2	
BH.	R.	Ch-J-9	2-1/2	1-1/2	3/8	R.	1 1/2	30	1 1/2	45	342	010H	010H	012	7 1/2	2 1/2	110	013	025	3B...	1B...	Au	B	2 1/2	1 1/2	8 20	2-3	1.5	3/8	7 1/2	3	
M.m.	O.	Ch-C-7	2-1/2	1-1/2	3/8	R.	1 1/2	30	1 1/2	30	3/32	003H	004H	TC	TC	80	020	020	...	...	Re	...	1 1/2	1 1/2	4 6	5	1 1/4	1/2 ± 1/8	1 1/2	4	
OH.	S.	AC-H9	2-1/2	2-1/2	3/8	R.	1 1/2	45	1 1/2	45	371	015	015	019	8B...	3 1/2	146	015	025	2B...	3 1/2	A	A	2 1/2	1 1/2	6 13 1/4	3-3 1/2	1 1/4 ± 1/8	1 1/2 ± 1/8	4	5	
OH.	S.	AC-H9	2-1/2	2-1/2	3/8	R.	1 1/2	45	1 1/2	45	371	015	015	019	14B...	6B...	156	015	025	10B...	4 1/2	A	A	2 1/2	1 1/2	8 17	1 1/4 ± 1/8	1 1/2 ± 1/8	1 1/2 ± 1/8	4	6	
OH.	S.	AC-H9	2-1/2	2-1/2	3/8	R.	1 1/2	45	1 1/2	45	371	015	015	019	14B...	6B...	156	015	025	10B...	4 1/2	A	A	2 1/2	1 1/2	8 17	1 1/4 ± 1/8	1 1/2 ± 1/8	1 1/2 ± 1/8	4	7	
OH.	S.	AC-H9	2-1/2	2-1/2	3/8	R.	1 1/2	45	1 1/2	45	371	015	015	019	14B...	6B...	156	015	025	10B...	4 1/2	A	A	2 1/2	1 1/2	8 17	1 1/4 ± 1/8	1 1/2 ± 1/8	1 1/2 ± 1/8	4	8	
BH.	S.	AC-K9	2-1/2	2-1/2	3/8	F	1 1/2	45	1 1/2	45	341	AA	AA	0	TC	TC	156	015	026	5B...	...	Ad	A	2 1/2	1 1/2	7 30	1 1/4 ± 1/8	1 1/2 ± 1/8	1 1/2 ± 1/8	4	9	
BH.	S.	AC-K9	2-1/2	2-1/2	3/8	F	1 1/2	45	1 1/2	45	341	AA	AA	0	TC	TC	156	015	026	5B...	...	Ad	A	2 1/2	1 1/2	7 30	1 1/4 ± 1/8	1 1/2 ± 1/8	1 1/2 ± 1/8	4	10	
OP.	S.	AC-G6	3-1/2	1-1/2	3/8	P	1 1/2	45	1 1/2	45	341	AA	AA	0	TC	TC	113	021	026	4B...	1 1/2	Ad	B	2 1/2	1 1/2	9 19	3 1/4-1 1/2	0-1/2	0-1/2	5 3/8	11	
OP.	S.	AC-G6	3-1/2	1-1/2	3/8	P	1 1/2	45	1 1/2	45	341	AA	AA	0	TC	TC	113	016	026	4B...	1 1/2	Ad	B	2 1/2	1 1/2	10 24	1 1/2	1	0-1/2	0-1/2	5 3/8	12
OH.	O.	112 AC-K11	2-1/2	1-1/2	3/8	R.	1 1/2	30	1 1/2	30	341	006H	013H	006	9B...	3 1/2	133	018	032	5B...	1 1/2	Ad	A	2 1/2	1 1/2	5 15	3 ± 1/2	1 ± 1/2	1 1/2 ± 1/8	4	13	
OH.	O.	112 AC-K11	2-1/2	1-1/2	3/8	R.	1 1/2	30	1 1/2	30	341	006H	013H	006	9B...	3 1/2	133	018	032	5B...	1 1/2	Ad	A	2 1/2	1 1/2	5 15	3 ± 1/2	1 ± 1/2	1 1/2 ± 1/8	4	14	
OH.	O.	112 AC-K11	2-1/2	1-1/2	3/8	R.	1 1/2	30	1 1/2	30	341	006H	013H	006	9B...	3 1/2	133	018	032	5B...	1 1/2	Ad	A	2 1/2	1 1/2	5 15	3 ± 1/2	1 ± 1/2	1 1/2 ± 1/8	4	15	
LH.	G.	Ch-J-8	2-1/2	2-1/2	3/8	F	1 1/2	45	1 1/2	45	340	006H	008H	010	TC	TC	146	020	025	TC	TC	Au	A	2 1/2	1 1/2	6 19	1 1/2	+	0-1/2	0-1/2	9 1/2	16
LH.	G.	Ch-J-8	2-1/2	2-1/2	3/8	F	1 1/2	45	1 1/2	45	340	006H	008H	011	2B...	3 1/2	146	018	025	TC	TC	Au	A	2 1/2	1 1/2	6 22	1 1/2	+	0-1/2	0-1/2	9 1/2	17
LH.	G.	Ch-J-8	2-1/2	2-1/2	3/8	F	1 1/2	45	1 1/2	45	340	006H	008H	011	2B...	3 1/2	146	018	025	TC	TC	Au	A	2 1/2	1 1/2	6 22	1 1/2	+	0-1/2	0-1/2	9 1/2	18
LH.	G.	Ch-H-10	2-1/2	2-1/2	3/8	F	1 1/2	45	1 1/2	45	340	006H	008H	011	2B...	3 1/2	146	018	025	5A...	2A...	Au	A	2 1/2	1 1/2	6 17	2	+	0-1/2	0-1/2	9 1/2	19
LH.	G.	Ch-H-10	2-1/2	2-1/2	3/8	F	1 1/2	45	1 1/2	45	340	006H	008H	011	2B...	3 1/2	146	018	025	5A...	2A...	Au	A	2 1/2	1 1/2	6 17	2	+	0-1/2	0-1/2	9 1/2	20
LH.	G.	Ch-J-9	2-1/2	1-1/2	3/8	F	1 1/2	30	1 1/2	45	342	010H	010H	012	7 1/2	3 1/2	146	018	025	3B...	...	Au	A	2 1/2	1 1/2	6 17	2	+	0-1/2	0-1/2	9 1/2	21
LH.	G.	Ch-J-8	2-1/2	2-1/2	3/8	F	1 1/2	45	1 1/2	45	340	006H	008H	010	TC	TC	146	020	025	TC	TC	Au	A	2 1/2	1 1/2	6 19	1 1/2	+	0-1/2	0-1/2	9 1/2	22
LH.	G.	Ch-J-8	2-1/2	2-1/2	3/8	F	1 1/2	45	1 1/2	45	340	006H	008H	010	TC	TC	146	020	025	5A...	2A...	Au	A	2 1/2	1 1/2	6 19	2	+	0-1/2	0-1/2	9 1/2	23
PH.	G.	Ch-J-8	2-1/2	2-1/2	3/8	F	1 1/2	45	1 1/2	45	340	006H	008H	011	5A...	2 1/2	146	020	025	4A...	1 1/2	Au	A	2 1/2	1 1/2	5 15	2	+	0-1/2	0-1/2	9 1/2	24
PH.	R.	Ch-6M	3-1/2	1-1/2	3/8	F	1 1/2	30	1 1/2	45	341	015C	015C	025	6B...	2B...	119	021	025	1 1/2	...	Ad	...	2 1/2	1 1/2	12 32	3	1	1/4	1/4	9 1/2	25
OM.	O.	105 Ch-7	2-1/2	1-1/2	3/4	F	1 1/2	45	1 1/2	45	341	013C	013C	...	9 1/2	3B...	112	013	025	4B...	1 1/2	Au	A	2 1/2	1 1/2	5 22	7	3/4	1/2 ± 1/8	8 1/4	26	
OH.	R.	Ch-7	2-1/2	2-1/2	3/8	R.	1 1/2	30	1 1/2	45	341	010H	010H	012	4 1/2	1 1/2	130	018	025	2B...	3 1/2	Au	A	1 1/2	1 1/2	5 11	2 1/2	1	1/4	7 1/2	27	
OH.	R.	Ch-7	2-1/2	2-1/2	3/8	R.	1 1/2	30	1 1/2	45	341	010H	010H	012	4 1/2	1 1/2	130	018	025	2B...	3 1/2	Au	A	1 1/2	1 1/2	5 11	2 1/2	1	1/4	7 1/2	28	
OH.	R.	Ch-J-9	2-1/2	2-1/2	3/8	R.	1 1/2	30	1 1/2	45	341	010H	010H	012	4 1/2	1 1/2	130	018	025	2B...	3 1/2	Au	A	1 1/2	1 1/2	5 15	2 1/2	1	1/4	7 1/2	29	
OH.	R.	Ch-J-9	2-1/2	2-1/2	3/8	R.	1 1/2	30	1 1/2	45	341	010H	010H	012	4 1/2	1 1/2	130	018	025	TC	TC	Au	A	1 1/2	1 1/2	5 15	2 1/2	1	1/4	7 1/2	30	
OH.	R.	Ch-J-9	2-1/2	2-1/2	3/8	R.	1 1/2	30	1 1/2	45	341	010H	010H	012	4 1/2	1 1/2	130	018	025	2B...	3 1/2	Au	A	1 1/2	1 1/2	5 15	2 1/2	1	1/4	7 1/2	31	
BH.	G.	Ch-J-8	2-1/2	2-1/2	3/8	F	1 1/2	45	1 1/2	45	340	006H	008H	010	10 1/2	4B...	134	020	022	TC	TC	Au	A	1 1/2	1 1/2	5 13	3 1/4-1 1/2	1-1 1/2	0-1/2	7	32	
BH.	G.	Ch-J-8	2-1/2	2-1/2	3/8	F	1 1/2	45	1 1/2	45	340	006H	008H	010	10 1/2	4B...	134	020	022	TC	TC	Au	A	1 1/2	1 1/2	5 13	3 1/4-1 1/2	1-1 1/2	0-1/2	7	33	
LH.	R.	Ch-C-7	2-1/2	2-1/2	3/8	F	1 1/2	45	1 1/2	45	340	010	013	014	2B...	3 1/2	112	018	028	7B...	2 1/2	Ad	A	2 1/2	1 1/2	6 18	1 1/2	1	1/4	7 1/2	34	
LH.	R.	Ch-C-7	2-1/2	2-1/2	3/8	F	1 1/2	45	1 1/2	45	340	006	013	010	1A...	1 1/2	109	016	028	7B...	2 1/2	Ad	B	2 1/2	1 1/2	8 21 1/2	1 1/2	1	1/4	7 1/2	35	
BH.	G.	100 Ch-7	2-1/2	1-1/2	3/8	F	1 1/2	45	1 1/2	45	341	015	015	015	5A...	1 1/2	104	020	023	10B...	3B...	Au	A	2 1/2	1 1/2	7 19	2 1/2	1 1/2	1/4	7	36	
BH.	S.	AC-K9	2-1/2	1-1/2	3/8	P	1 1/2	30	1 1/2	45	341	006C	009C	015	6A...	2 1/2	145	015	025	8B...	3 1/2	Au	B	2 1/2	1 1/2	7 16 1/2	2	1	1/4	4 3/4	37	
MO.	O.	105 Ch-J-9	2-1/2	1-1/2	3/8	P	1 1/2	45	1 1/2	45	341																					

Taxes

(Continued from page 35)

Of course, we must pay some taxes. There is no other way in which we can get our police and fire protection, our schools, our parks, our streets and roads, our public buildings and the proper administration of our public affairs. But there is such a thing as too much taxation. Too much taxation, like too much expense in doing any kind of work, slows business up, decreases buying and puts men out of jobs. Taxes are always passed along. They have to be. In passing them along, prices have to be raised without an increase in profits. In raising

prices, the number of possible buyers is reduced, output falls off and, beyond a certain point, employment has to be curtailed. Following that comes decreased buying power and following that comes still further reduction of both output and employment.

Bill said that he doesn't have to worry about taxes. We tell Bill again that he should worry about them. He should worry not only about those which he himself pays without knowing it, but he should worry about those which he knows his boss must pay. Bill, being in the line he's in, should worry, too, about the taxes which all those who drive automobiles have to pay just because they drive automobiles. We'll tell Bill why

Bill's boss, like everyone's else boss

these days, has to charge more for the work done in his shop and has to charge more for everything he sells in order to get the money with which to pay his taxes. He couldn't stay in business if he didn't. Now that's not just a lot of bunk. It's true. There are plenty of statistics and all kinds of figures that are accepted as right by those who know the most about it, which prove that all business taken as a whole does extremely well if, under favorable conditions, it makes as much as banks pay in interest on savings accounts. Some businesses make more, of course, but many make less and many others actually lose money, so the average for all business is pretty low. Business as a whole must, therefore, pass taxes on or, in other words, collect the money to pay them by adding the amount of the taxes to the prices they charge for what they do or what they produce.

Because Bill's boss has to pay heavy taxes, he has to charge more than he otherwise would and he, therefore, does less business. If you doubt that an increase in price, even though it may be small, cuts down sales, consider what happened a short time ago when a well-known automobile manufacturer who was leading the field in his price class decided to raise his prices just \$5.00 a car on his cheaper models. Before he raised his prices, he had a comfortable lead over his nearest competitor. Within two months after the increased prices went into effect his sales fell off to such an extent that his lead was cut to almost nothing. He saw his mistake and dropped his prices back where they had been. His sales immediately increased and his lead over competition was restored.

The lesson for Bill in this experience is that the smaller the taxes that his boss has to pay the more business he can do and the more he can afford to pay Bill.

The reason Bill should worry about the taxes that the other fellow's boss has to pay is that those taxes increase the prices that Bill has to pay for what he buys and he can, therefore, get less for what he has to spend.

The special taxes which those who drive automobiles have to pay should give Bill special concern. Let's just take the tax on gasoline. In the first place, let's point out that 28 per cent of the retail cost of gasoline is made up of federal, state and city taxes. In other words, if it were not for these taxes, the man who drives an automobile could buy more than 13 gallons of gas for what he now pays for 10 gallons and could and would do a lot more driving for the same outlay for gas. And that means a good deal to Bill for more miles driven means more wear and tear on the car and more wear and tear on the car means more work for Bill.

Experience has proved many times that excessive gasoline taxes reduce the amount of driving that gas buyers do. Anyone in the business of servicing automobiles should be a loud rooster for the lowest possible tax on gasoline.

Bill can ask, "But are our present taxes too high?" The answer is that if Bill is willing to work a day and a half each week just to pay the taxes which are concealed in the prices which he pays for everything he buys,

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with
every brake
job!**

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Insure Your Jobs**

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**Prevents Ruining of
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WITH VERY SMALL STOCK**

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Factory Warehouses: New York City • Chicago • Dallas • Los
Angeles • Portland • San Francisco • Atlanta • Cincinnati •
Kansas City • Boston.

he may not regard these taxes as excessive. But most of us would prefer to earn a closer approximation to a full week's pay for a full week's work. The net effect of our present taxes is that Bill works a week for about four and a half days' pay. The Government gets the difference. Things were no worse than that when our ancestors staged the Boston Tea Party.

There isn't much doubt that taxes are today seriously retarding recovery by putting four wheel brakes on business generally. Hidden taxes, taxes which we pay as a part of the price of this or that, have increased 286 per cent since 1932. In 1935, the federal government collected \$2,232,402,340 in hidden taxes. If our governmental extravagance isn't stopped, instead of slowing down, we'll go into reverse again. Don't take our word for it unless you want to. Take the word of the U. S. Department of Commerce. Take the word of the men who are running that department of our national government today. Here is what they said recently on the subject of "Spending Ourselves Into Recovery":

"Another indicator of economic change is afforded by the public debt, which has continued to mount rapidly, notwithstanding the substantial increase in the national revenues. Future business prospects are in a degree conditioned upon the possibility of bringing expenditures more in line with receipts and thus eliminating, partially at least, the uncertainties prevailing in connection with future taxation and other budgetary problems."

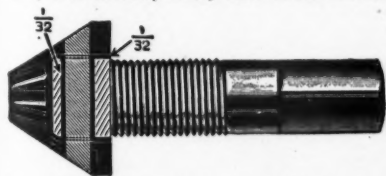
Bill surely should worry about taxes.

Permite Engine Rebuilding Package for Ford V-8

Aluminum Industries, Inc., Cincinnati, Ohio, makers of Permite Products, has announced a parts package containing a set of pistons, pins and rings, connecting rod bushings and bearings, and a set of intake and exhaust valves and guides, for rebuilding Ford V-8 engines. Sets are supplied with pistons from .020 in. to .060 in. oversize.

Champion Announces Brake Adjusting Screw for Fords

The Champion Anti-Rattler Co., Inc., St. Louis, Mo., has announced a



floating brake shoe adjusting screw for Ford cars, which they claim will stop groans in front and rear brakes. This adjusting screw, known as Champ-Items No. 909, is designed to permit both brake shoes to float at the adjusting screw, and is said to compensate for 0.040 in. eccentricity of shoe wear or misalignment of each shoe. List price, \$1.50 per set.

* * *

A. Ellis Bosley has been appointed a representative for the Keystone Reamer & Tool Co., Millersburg, Pa.

McAleer Mfg. Co. in New Plant

McAleer Manufacturing Co., producers of lacquer polishes and automobile heaters, expects to be in full



production in its new plant on Scotten Avenue, Detroit, by Sept. 15. All McAleer operations, which for some time have been conducted in three different plants, will then be consolidated under

one roof in what was the former Frigidaire plant. The four-story factory building is being remodeled and an office building of modernistic design is being constructed, the reconditioning program involving an estimated \$60,000.

Brunner equipment sales thus far for 1936 have exceeded the entire twelve months of 1935, according to a factory announcement.

* * *

Plans for a program of plant and equipment rehabilitation and modernization were disclosed by G. M. Williams, president of the Russell Mfg. Co., Middletown, Conn.



TAKING CHANCES

Business is business, and the thicker the traffic the faster the pennies. But he's no bargain for drivers with weak hearts—and weak brakes! AMCO Brake Lining will keep a man's heart out of his mouth and bring back the fun of driving. What a relief—the way it takes hold! Jobbers and service stations now offer it for replacement for all cars, trucks, buses.

ASBESTOS MANUFACTURING COMPANY
HUNTINGTON INDIANA



KOETHE

AN AMERICAN

IT HAS BECOME A STANDARD



You've heard of Koetherizing, of course, because it is now a NATIONAL SERVICE and more than a half million pistons have already been resized by this modern method.

The KOETHERIZING process is as simple as it is SPEEDY and ACCURATE. It does not delay your jobs and piston expansion can be controlled to within .001 of an inch in any aluminum piston.

Let us say, for example, that you want a certain piston expanded .005 to compensate for both piston collapse and cylinder wear. The piston is placed in the KOETHERIZING machine and its two inner surfaces on the thrust side are subjected to a blast of steel shot, under air pressure, for the full length of the skirt. This simultaneous blasting action expands the metal, itself, without harming or marring it. The air pressure and the time of exposure to the blast of shot control the amount of expansion.

JOBBER WHO NOW

ALABAMA
Davis Motor Supply.....Mobile
Auto Parts & Tool Co.....Montgomery

CALIFORNIA
P & W Parts Store.....Alhambra
Harrison Motor Parts.....Fresno
Hockaday & Phillips, Inc.....Fullerton
Wellington Auto Parts.....Hollywood
Colyear Motor Sales Co.....Los Angeles
Frazier Wright Co., Ltd.....Los Angeles
Lambert Co., Ltd. (and branches)

Smith Auto Supply Co.....Los Angeles
Strong's Auto Parts.....Modesto
Colyear Motor Sales Co.....Oakland
K & S Piston & Ring Shop.....Oakland
Henderson Brothers.....Sacramento
Lambert Co., Ltd.....San Bernardino
A. B. Shaw Co.....San Diego
Lambert Co. of N. Calif. San Francisco
Automotive Parts Co.....San Pedro
Hockaday & Phillips, Inc.....Santa Ana
Bruner & Miller.....Santa Monica
John Bereny.....Santa Rosa
Morris Auto Supply Co.....Stockton
Hockaday & Phillips, Inc.....Whittier

COLORADO
The B. K. Sweeney Elec. Co.....Denver
The B. K. Sweeney El. Co. Grand Junc.
The B. K. Sweeney Elec. Co.....Pueblo

CONNECTICUT
Kenyon Bearings & Auto Parts Co., Inc.
Hartford
Schleibel Brothers.....Manchester
Connecticut Bear'gs Co., Inc. New Haven

Horton, Gallo, Creamer Co. New Haven
Horton, Gallo, Creamer Co.....Stamford
Kaplan Brothers.....Waterbury

DELAWARE
Motorcar Service Co.....Wilmington
DISTRICT OF COLUMBIA
Phelps Roberts Corp.....Washington

FLORIDA
Florida Motor Service, Inc. Jacksonville
Bernier Pease, Inc.....Miami
Girdlestone Auto Supply Co. Pensacola
Genuine Parts & Equip., Inc. Tampa

GEORGIA
Southern Bearing & Parts Co. Atlanta
Bearings Parts & Supply Co. Augusta
Auto Supply Co.....Columbus
LeFiles Automotive Service.....Valdosta

ILLINOIS
Golden Rule Auto Ser., Inc. Bloom'gton
Roger's Motor Equipment Co. Champaign
Babbitt Auto Parts Co., Inc. Chicago
Motive Parts Co. of America
(and branches) Chicago
Northeastern Auto Wrecking Co. Chicago
Southwest Auto Parts Co. Chicago
Marlatt Battery & Mfg. Co. Danville
B. B. Burns, Inc. Decatur
Hudson Auto Supply Co. E. St. Louis
Motive Parts Co. of America. Evanston
Kunz Bros. Automotive Parts. Freeport
Motive Parts Co. of America. Oak Park
Leverick Auto Supply.....Ottawa
Young's Mechanical Service.....Rockford

INDIANA
Jack Hickey & Co.....Gary
Kemp Machine Co.....Muncie

IOWA
Skerik Parts Service Co.....Burlington
Barron Motor, Inc. Cedar Rapids
Standard Motor Parts Co. Des Moines
Shafer Auto Parts.....Hampton
The Auto Supply.....Iowa City
Penney Bros. Osage
West. Battery & Elec., Inc. Sioux City
Clough Auto Parts.....Storm Lake
Sitlers Auto Parts Co. Washington
Handler Motor Co. Waterloo

KANSAS
The Auto Supply Co. Hutchinson
Parts Supply Co. Wichita

KENTUCKY
Byles Auto Parts Co., Inc. Ashland
Wombwell Automotive Pts. Co. Lexington
Columbia Automotive Pts. Co. Louisville

LOUISIANA
Stand'd Auto Pts. & Mach. Co. Alexandria
M. H. Rykowski.....New Orleans
Interstate Elec. Co. of
Shreveport, Inc. Shreveport

MAINE
Darling Automobile Co. Auburn
The James Bailey Co. Bangor
The James Bailey Co. Portland
Sanford Battery Co. Sanford

MARYLAND
K & G Sales Co. Baltimore

MASSACHUSETTS
Northeast Auto Pts. Co., Inc. Cambridge
Framingham Auto Pts. Co. Framingham
Essex Tire & Supply Co., Inc. Lynn
Eastern Auto Parts Co. Malden
Service Parts Co., Inc. Malden
Auto Replacem't Pts. Co. North Adams
S'th Shore Automotive Serv., Inc. Quincy
R. McCulloch, Inc. Salem
Auto Service Parts Co. Somerville
Auto Gear & Parts Co., Inc. Springfield
Christie & Thomson Inc. Worcester

MICHIGAN
Detroit Cyl. Grinding Co., Inc. Detroit
John Sivko Co. Detroit
Flint Piston Service Co. Flint
Steckroth & Ferguson.....Grand Rapids
Automotive Parts & Sup. Co. Saginaw

MINNESOTA
Gendler's Automotive Service.....Austin
Bemidji Auto Parts Co. Bemidji
Colby, Ramm & Co. Minneapolis
Manufacturers Motor Parts Co. Minneapolis
Colby, Ramm & Co. (branch) St. Paul

MISSOURI
Chilllicothe Auto Supply Co. Chilllicothe
Midway Auto Supply Co. Kansas City
Piston Service Co. Kansas City
St. Louis Auto Parts Co. St. Louis
Universal Parts & Service Co. St. Louis
Wellston Auto Parts Co. St. Louis
Webster Groves Auto Pts. Webster Groves

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◆ For the first time, ignition engineers have engineered a spark plug as it must be engineered . . . as an essential unit in the ignition system . . . built to work in perfect harmony with the other units and thus produce improved engine performance. Known technically as matched impedance, this absolute balance between all units of the ignition system is the greatest advance in spark plug history.

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Auto-Lite Spark Plugs are now being produced in a new modern Spark Plug Plant. For complete details of the Auto-Lite Plug and the aggressive merchandising plan that will help you sell it, call your jobber today. If he cannot furnish you complete information, write or wire to Merchandising Division . . . THE ELECTRIC AUTO-LITE COMPANY, TOLEDO, O.

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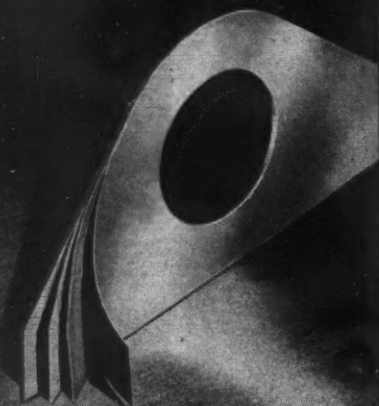
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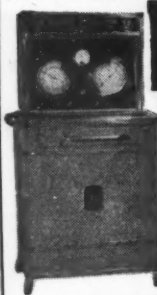


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THE LANTZ-PHELPS CORP.
943 E. Third St., Dayton, Ohio

Voltage Control

(Continued from page 33)

the armature and reseal the brushes. If this does not bring it up, the generator should be removed and overhauled.

Having eliminated the generator as a source of trouble, the next step is to check the operation of the voltage regulator. Remove the wire from the "IGN" terminal, and connect that terminal to the "BAT" terminal by means of a jumper wire. Then connect the positive voltmeter lead to the "IGN" terminal of the regulator, and the negative lead to ground. Remove the wire from the "BAT" terminal. The positive ammeter lead is then connected to the "BAT" terminal, and the negative lead connected to the wire that was removed from this terminal. Again set the engine speed at 30 to 35 m.p.h. and adjust the resistance in the tester to show a charging rate of from 6 to 10 amps. If the generator is hot, the voltmeter should show a reading between 7.4 and 7.8 volts.

All of the above readings are taken with the regulator cover in place. Should it become necessary to remove the cover and adjust the regulator, the cover should be reinstalled and the regulator cycled before another reading is taken. To cycle the regulator, drop the engine speed down to idle, and then bring it up to testing speed.

The regulator voltage is adjusted by bending the hanger to which the lower end of the armature coil spring is attached. Increasing the tension of the spring increases the voltage; decreasing the tension decreases the voltage. Care should be exercised in making this adjustment, because if the regulator is set to charge higher than 7.8 volts it will have a tendency to burn out lamp bulbs, while it will fail to keep the battery fully charged if set lower than 7.4 volts.

Should the regulator fail to respond to the normal adjustment described above, it will be necessary to adjust the air gap between the hinged armature and the magnetic core. Press the armature down until the fiber bumper on the end of the top regulator contact spring just barely touches the contact spring stop. In this position the air gap between the hinged armature and the core should be .070 in. Next, release the armature and check the gap between the fiber bumper and its stop; this should be between .008 in. and .013 in., and can be adjusted by bending the upper armature stop. The hinged armature should then be pressed down until it touches the lower armature stop, and adjustment should be made by bending the lower armature stop until a gap of from .015 in. to .025 in. is secured between the contact points. The contact points should be clean and in alignment with each other, and should have a pressure of from 3½ to 4 ounces, measured at a point directly opposite the contacts, and at the instant the points separate. Adjust the pressure by slightly bending the contact spring carrying the upper contact.

The relay points of the "step" type voltage control open at approximately 8.3 volts and close at approximately

(Continued on page 87)

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this Fall!"

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CRESCENT CABLE COMPANY
PAWTUCKET, R.I., U.S.A.

(Continued from page 86)

7.2 volts. The opening voltage can be increased or decreased by adjusting the armature spring. The closing voltage can be adjusted by increasing or decreasing the armature air gap, which is accomplished by bending the lower armature stop. With the armature held down against the lower stop, the air gap should be between .029 in. and .038 in. Increasing the air gap increases the closing voltage, and decreasing the air gap decreases the closing voltage. The voltage readings are taken with the voltage regulator cover in place, and with an accurate voltmeter having a zero to 10-volt scale graduated in tenths, the voltmeter being connected between the terminal marked "BAT" and to ground.

Maintenance Woman

(Continued from page 41)

While I have done almost everything in the way of repairs, I like particularly to grind valves. The work is not too hard for a woman, and is usually very interesting. A woman is usually careful to clean out all carbon, while the average man is apt to be somewhat careless in such matters.

A woman can also be very useful in looking after the tools and equipment. I have worked out a system which I would recommend for any shop. First of all, tools must be thoroughly cleaned with gasoline after each job and put away in their proper places.

In addition, I have made it a rule to clean all tools and equipment at the close of the work day, and put them away in their accustomed places all set for the next day.

I am a crank on cleanliness, and this, I am glad to say, has been responsible for the fact that we have not had any accidents in the shop. I believe most accidents happen because the men handle greasy tools, which easily slip out of their hands. I see to it that the men wash their hands as frequently as possible, and I always have cleaning solvents ready for their use.

And then, too, a lot of time is often lost because tools and equipment have not been in their proper places ready for use. The woman who has worked around a kitchen knows the value of order in placing knives and saucers and pots and pans in their accustomed places, and I have tried to apply this idea in the shop. We have a separate bin for cotter pins, another for washers, and another for nuts and bolts, and so on. All of the hand tools are kept in a compact space, handy for the men. You never see a hammer or wrench lying around on the floor for someone to stumble over.

I pay particular attention to hoists, jacks and other labor-saving devices, and see to it that the men use them. I insist that the men refrain from unnecessary lifting.

I realize that a woman, in her insistence on details, can be a nuisance in the shop. I never try to tell the mechanics how to do their work. I let them alone. And here is a recipe for a mechanic's wife who is trying to be a real helpmate and keep peace in the family! Never interfere when he is selling a repair job. Customers don't like the idea of a woman butting in.

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Winter service requires that careful attention be paid to crankcase oil. Many ordinary motor oils become so thick at 32° above ZERO (freezing point of water) that motors start slower, run harder and use excessive amounts of fuel. If medium and heavy motor oils are used for winter driving, 1 quart of Springeez should be added to 4 quarts of ordinary oil. Springeez is the original winter oil. Pours at -50°.

THICK OIL MAKES STARTING DIFFICULT

Heavy crankcase oils at low temperatures cause the motor to turn over with great difficulty. This places excessive demands on the whole starting system. More current is required from the battery, which is low in efficiency during cold weather. Batteries 100% efficient at 80° are only 40% efficient at ZERO. Tighter fitted bearings and high r.p.m. motors make this year's need for Springeez greater than ever before.

LOW TEMPERATURES CAUSE HARD SHIFTING

Transmission and differential greases congeal at low temperatures, making it difficult if not impossible to shift gears. These heavy lubricants will not flow to the bearings. Serious trouble may result. Service managers and fleet operators rely on Springeez.

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Kerosene, besides having a negative or minus lubricating factor, will cause rust and assist corrosion. It detrimentally "cuts" ordinary motor oil. At ordinary operating temperatures of the motor, kerosene evaporates, allowing crankcase oil to return to its former heavy, thick condition. Play safe this winter. Use Springeez, the original winter oil.

EFFECT OF ZERO ON OIL

This photograph shows the actual effect of zero temperature on an oil. Upper bottle shows ordinary heavy motor oil at zero. Lower bottle shows same oil, to which 25% Springeez was added, and the temperature dropped to zero. This clearly indicates that any oil is a winter oil with Springeez. Bulletins on request. Halstead Products Co., 2937 Chapman St., Oakland, Calif. Please send us name of your jobber.



More Power To You

(Continued from page 21)

this job is 6.2 to 1 and it has a bore and stroke of 3 x 4 1/4 in., resulting in a total displacement of 204.3 cu. in.

To get the displacement of one cylinder, divide the total displacement by the number of cylinders. In this case it would be 240.3 divided by 8 or 30.0 cu. in. To convert the cubic inches to cubic centimeters multiply by 16.4. Then 30.0 cc. times 16.4 equals 492 cc. The clearance volume of this particular engine is then obtained by means of the formula previously given, that is

$$B = \frac{A}{C - 1}$$

Substituting the values for the Olds in this formula we have
Clearance 492

$$\text{volume} = \frac{492}{6.2 - 1} \text{ or } 94.6 \text{ cc.}$$

The valve-gasket correct for an engine having a 3-in. bore is 10 cc. This is subtracted from the clearance volume to obtain the actual volume in the cylinder head which is generally known as the dome volume. In this case it is 94.6 minus 10 or 84.6 cc., which is the dome volume for the Olds 8 with a 6.2 compression ratio.

It is then necessary to go through this same calculation once more to obtain the dome valve with the desired compression ratio of 6.9 to 1.

$$\text{Clearance volume} = \frac{492}{6.9 - 1} \text{ which equals } 83.4 \text{ cc.}$$

Then subtracting the valve-gasket correction of 10 cc. we have 73.4 cc. as the dome volume for the new compression ratio.

To find the amount the cylinder has to be reduced to obtain the desired compression ratio, subtract the dome volume corresponding to the 6.9 ratio from the dome volume corresponding to the 6.2 or original ratio. In this case it is 84.6 minus 73.4 which equals 11.2 cc.

That is all there is to the calculation. The next step is to remove the cylinder head and place it on a bench with the combustion chambers upward. Then thoroughly scrape out all the accumulated carbon and level the head accurately by means of a spirit level.

Using a mixture of light engine oil (a 50-50 solution of S.A.E. 30 oil and kerosene is satisfactory), fill the combustion chamber with the oil until the level of the oil is just even with the top of the chamber. A slight seepage may show around the edge of the chamber. By using a 100 cc. graduate as shown in the illustration it is easy to determine the exact cubical content or volume of the combustion chamber. This should be checked against the calculation for the volume corresponding to the standard compression ratio.

The next step is to remove from the cylinder head sufficient oil to reduce its contents to the number of cubic centimeters required for the new compression ratio. This can be done by means of an eye dropper. Then place a depth gage across the combustion chamber as shown in one of

(Continued on page 90)

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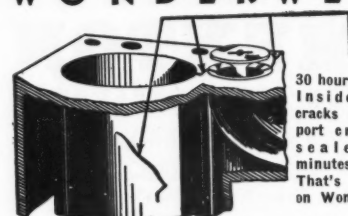


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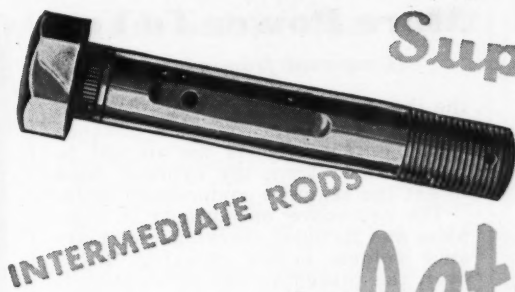
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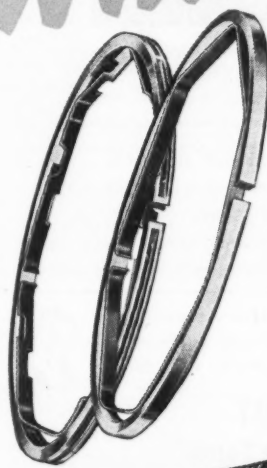
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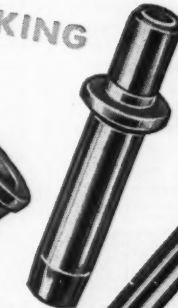
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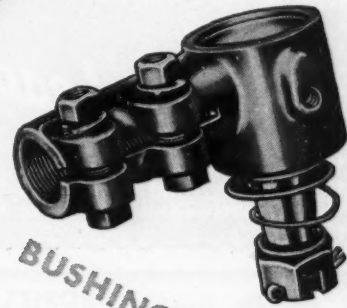


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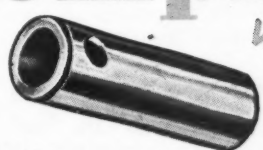


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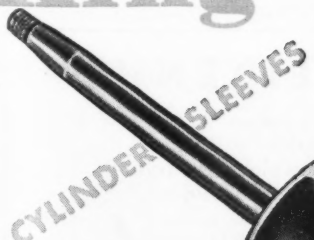


VALVES

on the

NELSON
BOHNALITE
PISTONS

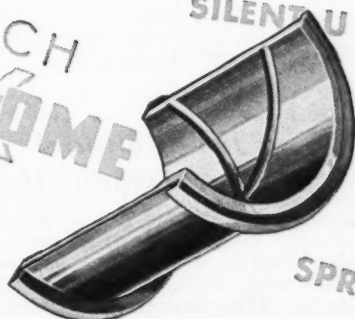
King Quality standard



CYLINDER SLEEVES

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SPRINGS

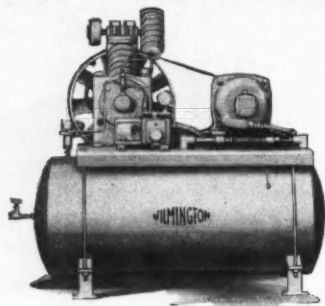


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More Power To You

(Continued from page 88)

the illustrations and measure down to the surface of the oil. The distance shown on the gage is the amount to be machined from the cylinder head to get the required compression ratio.

The procedure as outlined is complete and includes checking the clearance volume before checking. However, the procedure can be shortened, if desired, by simply making the calculation to find the clearance volume corresponding to the compression ratio desired. Then pour that amount of fluid into the combustion chamber and measure down from the surface of the cylinder head to the surface of the metal to be removed from the cylinder head.

However, before the head is machined, the deck thickness or the thickness of the metal to be machined should be carefully checked. On small bore engines this should not be reduced to less than 1/8 in., 5/32 in. is to be preferred. On larger-bore engines the minimum is 5/32 in., but 3/16 in. is preferable. The calculations given at the beginning of this article apply to all engines in which the piston is flush with the top of the block at top center. On Buick engines and some others, the piston does not reach the top of the cylinder block. In such cases the volume of the cylinder from the top of the piston to the top of the block, plus the gasket volume, must be subtracted from the total combustion chamber volume to obtain the dome volume.

On all jobs it is necessary to make sure that the valves will not strike the cylinder head or the top of the piston. Naturally this should be done before machining. In some instances it is possible to overcome such a condition by milling out the pistons or cylinder head to give sufficient clearance for the valve heads.

Smaller-bore L-head engines can usually be raised to 6.8 or 7.0 to 1 ratio. Older model small-bore jobs should be kept somewhat lower, approximately 6.5 to 1. Larger-bore L-head engines not more than three or four years old will generally operate satisfactorily at compression ratios as high as 6.5 to 1.

On small-bore valve-in-head engines compression ratios should not be increased above 6.5 to 1 and larger engines to 6.0 to 1.

Of course, with higher compression ratios, it is necessary to use colder-type spark plugs, which should be set to factory specifications or slightly smaller. It is also necessary in the majority of cases to retard the spark slightly. Most important of all is the use of the best fuels with octane ratings of approximately 76.

"Wiry Joe" Universal Lighting Harness

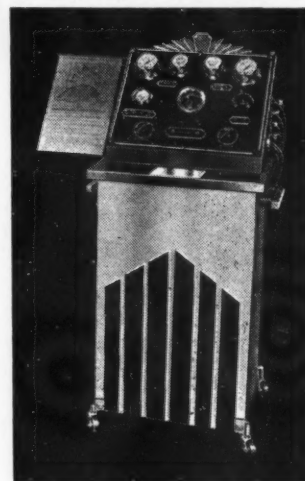
Crescent Cable Co., Pawtucket, R. I., is marketing a new "Wiry Joe" universal lighting harness for Chevrolet, 1929, 1930, 1931 and 1932 cars. The harness is individually packaged, and is said to be supplied complete with a wiring diagram.

A NEW TESTER

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Features every necessary Test



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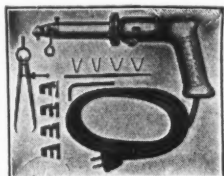
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THE FASTEST SELLING WELDER ON THE MARKET TODAY

Studebaker for 1937

(Continued from page 18)

Among the noteworthy chassis details for 1937 are: The "positive controlled automatic overdrive" transmission on the President, which is continued from the previous series; Hypoid rear axle on all models; lowering the floor level 3 1/16 in., and a new double-drop frame carrying out the box section side rail X-member construction which was introduced last year. The "planar" individual front-wheel suspension, which has been used for two seasons, is continued as standard on the President and optional on the Dictator. Direct-acting shock absorbers are used front and rear, being built-in as a part of the linkage on the "planar" front axle.

The new Ross cam and twin lever steering gear is found on all 1937 models. Its angular arm travel is 100 degrees as compared with the former travel of 80 deg., producing a greater mechanical advantage and minimizing road shock. The Ross gear is particularly effective for parking since the movement of the wheels in the parking range is almost doubled.

President models will feature the Delco-Remy shunt-wound generator with automatic current and voltage control, assuring maximum battery charging rate irrespective of road speed but preventing over-charge at all times. Auto-Lite ignition units are continued on the Dictator.

The automatic "hillholder," a safety feature introduced by Studebaker last year, is continued on all models. Dictators are fitted with a rubber-insulated universal joint recently developed by Thompson Products. An over-running starter clutch, manually engaged on Dictators and with dash button control on Presidents provides positive starting in cold weather. The clutch permits continuous cranking until the speed of the crankshaft exceeds the speed of the cranking unit.

An improved gearshift, unusually light, is obtained through a new synchronizer unit on all models. This synchronizer unit, exclusive to Studebaker, is based upon a simple, automatic and foolproof floating ring, having a blocking action and carrying a synchronizing cone. This floating ring prevents shifting to second gear until the speed of engaging gears, i.e., the synchronizing sleeve internal gear and the second speed main shaft gear, are running at approximately the same speed.

The parking brake lever has been moved to a position just below the instrument panel at the left of the wheel, clearing up the compartment and eliminating the obstruction at the left front door. Hydraulic brakes are standard equipment.

Use of the hypoid rear axle and double-drop frame has enabled body engineers to increase leg room to 47 in. in the sedan rear compartment. Front and rear door openings are 44 in. from top to bottom. Luggage compartment volume has been generously increased by using a "flat" type of gas-tank. Bumper jacks now are standard equipment.

One of the most interesting of the new features is the adoption of rotary

(Continued on page 92)

Full Size Professional ARC WELDER

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Amazing Machine, with Efficiency of Arc Welders Selling for \$145.44 to \$800.00. Offered at Breathtaking Low Price.

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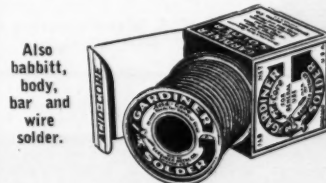
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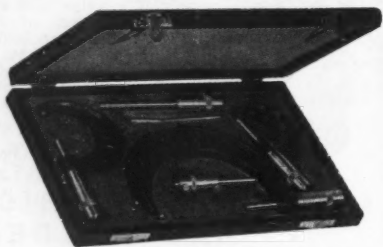


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C. V. S. Manufacturing Co.
Flint, Michigan

Studebaker for 1937

(Continued from page 91)

door latches which require only a finger tip pressure for engagement. As the door swings shut, the rotary element engages automatically. Any movement of the body automatically tightens the latches, thus compensating for wear and preventing rattle due to looseness.

Another improvement of interest to the motorist is the built-in defrosting arrangement consisting of two air ducts in the top of the instrument panel opening just below the rear of the windshield. These ducts may be connected with the car heater, thus sending a current of warm air against both sides of the windshield.

Body shells of the 1937 Studebakers are of all-steel construction, entirely free from wood members.

The new overdrive transmission on the President is automatically selective. It may be cut in or out at any speed above 35 miles per hour. While the general principles of operation are substantially as before, the over-running roller clutch functions only temporarily after disengagement of the overdrive, to pick up the direct drive.

Acheson Colloids Inaugurates "Vacation or Double Pay" Plan

The Acheson Colloids Corp., Port Huron, Mich., has recently inaugurated a system of vacation awards to factory employees.

Rather than cash bonuses or enforced vacations, this Company has arrived at a method of offering the employee a choice of time off or continued work with double pay.

For every year of employment, one day of vacation with pay will be awarded until a maximum of two weeks has been reached.

The novelty, so far as the Company knows, occurs in a clause which states that an employee, if he so desires, may waive his right to time off and continue to work receiving double pay for as many vacation days as he has earned.

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CAR HEATERS

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Champion Conversion Unit

For Ford Carburetors

The Champion Anti-Rattler Co., St. Louis, Mo., has announced their No. 901 Carburetor Conversion Unit Set for 1934, '35 and '36 Ford V-8 cars. The Unit Set is said to consist of two special jets, two compensating brass bushings and one vacuum brake spring. Designed to give added fuel economy and better carburetion, it is claimed that this unit has given 20 per cent additional fuel economy by actual test. To install, remove carburetor and tap bushings into intake manifold riser opening flush with surface. Remove standard carburetor jets and install the two special jets. Replace the standard vacuum brake spring and install the special light tension governor spring. List 75c. per set.

P & D Mfg. Offers New

Line of Air-Cooled Coils

P & D Mfg. Co., Long Island City, N. Y., has announced a line of new type coils known as Super Dynamic, the outstanding feature being a one-piece aluminum housing to provide air cooling. The housing is deeply corrugated, increasing the outer cooling surface, and the coils are said to be sealed by a P & D exclusive process which makes them moisture-proof and prevents current leakage.



Edison-Splitdorf Buys Plant

The Edison-Splitdorf Corp., West Orange, N. J., one of the Thomas A. Edison Industries, has announced the outright purchase of its Bethlehem, Pa., plant bringing the company's total manufacturing facilities to nine acres. The 30,000 square foot plant at Bethlehem is used exclusively for the modern line production of Edison spark plugs for the automotive trade.

Advertising Counsel Named

The Anderson Co., Gary, Ind., makers of ANCO Vision-Control Products, has appointed Schwab and Beatty, Inc., New York, as advertising counsel.

A campaign is now in preparation, for release in national weekly magazines this fall, devoted to the company's recently announced "Sleet-Master."

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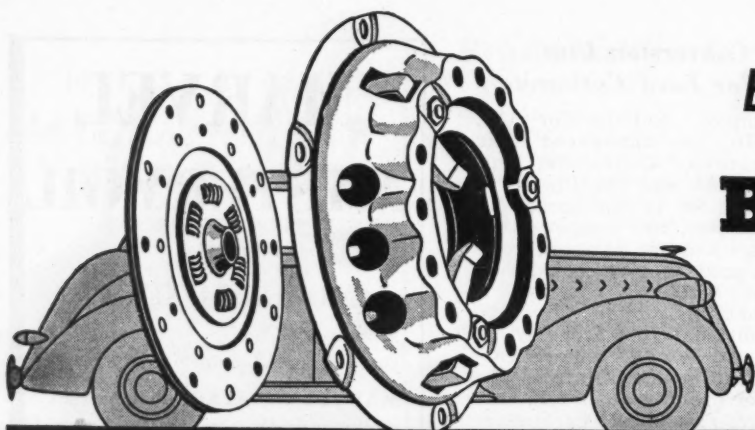
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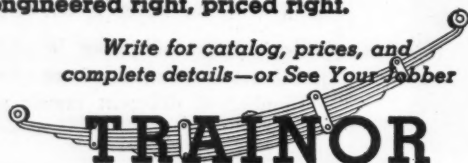
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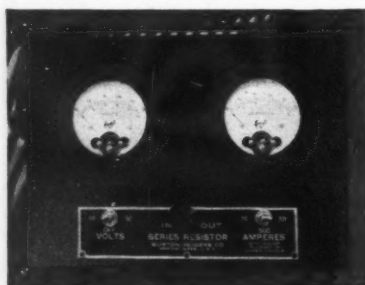
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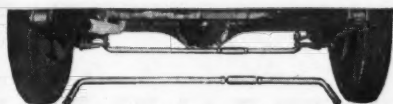
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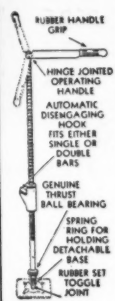
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The Willard Storage Battery Co., Cleveland, Ohio, has just announced the new Willard Starting Service that goes beyond the battery. The service includes a check with a new piece of equipment that is said to detect overload, voltage losses, loose connections, potential short circuits and other starting system defects without removing any of the parts from the car. The new instrument is portable, and very easy to handle.



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Municipal and state legislation which will make it a serious offense to drive antiquated commercial and pleasure vehicles on city streets or highways are needed to bring the flagrant traffic violator into court or force him to have his car properly adjusted, mechanics and service men from all sections of the country attending the alinement and safety school of the Bear Manufacturing Company, Rock Island, Ill., declare.

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A new trade name, "Prep-Sol," has been chosen to identify the duPont product formerly known as "Sol-Kleen," which is for use by refinishers of automobiles to clean and prepare old lacquer and synthetic finishes for recoloring with "Duco" and Automotive "Dulux" finishes.

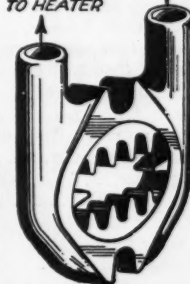
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